PROPOSED PLAN FOR CLEANUP OF UNEXPLODED ORDNANCE

Public Meeting
Westbank Inn
Idaho Falls, Idaho
February 4, 1992
6:30 p.m.

PANEL MEMBERS:

Lisa Green, DOE-Idaho
Howard Blood, U.S. EPA
Shawn Rosenberger, IDHW
Donna Nicklaus, DOE-Idaho
Mark Lusk, EG&G Idaho
Leah Street, EG&G Idaho

DENECE GRAHAM
IDAHO CERTIFIED SHORTHAND REPORTER
5217 North Turret Way
Boise, Idaho 83703
(208) 338-9139

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MODERATOR GREEN: I'd like to welcome everyone here at tonight's meeting and we're glad you were able to attend and we look forward to a very productive evening here tonight.

My name is Lisa Green. Tonight I don't have a real hat, but I will be wearing two different hats. First I'll be acting as a moderator for the meeting. As moderator, my job is to direct traffic and make sure we get through the agenda smoothly and to make sure that everybody who wants to comment or ask questions will have an opportunity to do so.

The other hat that I'm going to be wearing tonight will be that of the remedial project manager for DOE-ID. As the remedial project director, I'll be helping to answer some of the questions that you provide for us to answer on these projects.

I'd like to introduce the other people up front that you see here. On my far left is Howard Blood. Howard works for the U.S. Environmental Protection Agency out of Region 10 in Seattle. Howard is the remedial project manager for the ordnance project that we're going to be discussing tonight and he will be

representing EPA here for us throughout the evening.

Next on my immediate left is Shawn Rosenberger. Shawn is representing the Idaho Department of Health and Welfare for the State of Idaho. Shawn is the technical manager for the Idaho Falls office of the Division of Environmental Quality here.

Also in the audience, Ron Lane, also works for Idaho's Division of Environmental Quality in the Boise office, and Ron will be participating up here on the panel when we discuss the TAN project later on this evening.

To my far right at the other table is Donna Nicklaus. Donna is the project manager on the ordnance cleanup project for DOE, the first topic that we're going to be discussing here tonight.

Leah Street and Mark Lusk are to her right. They are project managers for the main contractor on this job, EG&G Idaho.

In the front row, we have John Walsh. John works for the INEL public affairs office.

As you know, the topics of discussion tonight are Test Area North injection well and

groundwater cleanup and the ordnance cleanup project.

If you have any questions that fall outside of those projects or outside of environmental restoration, please feel free to contact John at the breaks or after the meeting and he'll either provide you with answers or make sure you get answers to your questions.

Reuel Smith -- Reuel, would you raise your hand -- at the back of room. Reuel is the INEL community relations coordinator and if you have any questions about the information repositories or meeting schedules or other general community relations topics, he will be glad to provide answers for you.

I'd also like to recognize the representatives from the office of Senator Symms, Dixie Richardson. Dixie? Thank you.

And from the office of Senator Craig, Jeff Schrade.

And with that, I'd like to provide an opportunity for Howard and Shawn to give some opening remarks before we proceed with the meeting.

Howard?

MR. BLOOD: Good evening. My name is Howard Blood, and as Lisa said I'm here representing the Environmental Protection Agency for these two projects, three projects really, in these meetings tonight.

Also as Lisa said, I was directly involved with developing the proposed plan for the unexploded ordnance and I have a -- I would say a working acquaintance with the other projects that are being discussed tonight.

The EPA has been involved in these proposed plans from their inception and we believe that the alternatives that have been evaluated represent viable alternatives and that the remedies which are being proposed are valid approaches to the problems that have been identified.

It should be emphasized that both of the actions that are being taken here are interim actions, and that is sometimes a tough concept to really get a handle on all the implications of that, but basically these are actions that are taken early on and are consistent with what we believe will be taken later. They are consistent with the Federal Facilities Agreement which was

recently signed between DOE, the State of Idaho and EPA.

These interim actions will also help us with fine tuning processes that are outlined in that FFA and may help us proceed more quickly on some of the later projects, because we'll have some of the bugs worked out of the system.

We're here tonight really to solicit your comments, not only because that's what the law requires us to do under the Comprehensive Environmental Restoration, Compensation and Liability Act, but also because that's our responsibility as public agencies. And we earnestly solicit your input on these. There's no guarantee that what has been presented in these proposed plans will be what is finally done. If there's a better idea presented tonight, we'll certainly follow up on it.

With that, I'll give Shawn a chance to say what the State's --

MR. ROSENBERGER: I think you took all my lines. That's all right.

As Lisa said, I'm Shawn Rosenberger, the technical manager for the State's Division of Environmental Quality here in Idaho Falls.

Through this agreement, the State plays a very interactive role in developing these proposed plans, and the State is supportive of both of these proposed plans being presented tonight.

I'd like to remind you again that these plans are, in fact, proposed plans, and tonight we're here to take your questions and comments on these plans. They're not a final decision by the three agencies up here tonight.

What we want are your comments and questions, which we can take into consideration in making our final decision. If you'd like to discuss the proposed plan with the State, you can call me in the -- again, I'm in Idaho Falls, and my number is 525-7300.

And I'm personally involved in the ordnance proposed plan. For the TAN injection well, Ron Lane is here. He's from Boise. His number is 334-5860. And you can also contact Dean Nygard, who is the INEL technical -- or INEL project manager overall for the State. And he's basically our main focal point ensuring consistency between the field office and the central office in Boise.

Again, I'd just like to encourage your comments and any questions you have here tonight, and that's about all I have.

MODERATOR GREEN: Thank you, Shawn and Howard.

With that, I'll try to get some of the administrative housekeeping type information out of the way here, so we can get on to the interesting technical part of the meeting.

First, I'd like to talk a little bit about meeting goals here tonight. There are two desired goals for this meeting. One is to get your input on the interim action proposed plans for the cleanup for the injection well and cleanup for the unexploded ordnances.

The proposed plans are, as has already been stated, they're at the stage where DOE and the State are proposing their preferred alternative based on their understanding of the site conditions and available technologies, but we need public input to complete the package and be able to come to the best decision possible for these two cleanups.

Input received both orally at the public meeting and written comments sent in

during the comment period will be considered by the agencies in evaluating and determining the final decisions for these two projects.

Second goal of this meeting is to give you an opportunity to ask questions and provide DOE with your thoughts on how to proceed with the broader cleanup of the groundwater contamination up at the Test Area North on the INEL.

We're just -- we're all just now in the process of developing potential alternatives and evaluating ways to address this problem, so your input tonight can assist us in coming up with the best way to tackle this problem.

I'd like you all to, if you don't have a copy of the agenda, I believe, Reuel, we have extra copies back there and we can pass them out to make sure everybody knows what's on tap for tonight.

As you can see from the agenda, the meeting is divided into three basic parts for the three topics on our agenda.

The first first topic is Proposed Plan for Cleanup of Unexploded Ordnance Locations. We'll be providing a technical presentation, providing you an opportunity to ask questions and

get answers about that project, and then finally we'll have a period where we will take oral public comments on that project.

The second, we'll take a short break, then the next topic will be the Proposed Plan for the Injection Well and Surrounding Groundwater at the Test Area North. Same general procedure for that. We'll provide you with a technical presentation and an opportunity then to provide -- or ask us questions and get answers to your questions, and then finally we'll wrap that topic up with an opportunity for you to provide oral comments on that plan.

The last topic will be the scoping for the Remedial Investigation and Feasibility Study that's going on for the groundwater contamination at the Test Area North. Now, this topic is in the earlier stages of development and your comments and ideas will help guide us through that study.

After the presentations by the staff, your questions can either be submitted in writing using the note cards that you find on your chairs when you came in tonight, or if you prefer you can use the microphone, which we'll be moving it

toward the center.

Note cards help us for a couple reasons. One, it does provide -- it provides the person answering the question with a moment or two to get their thoughts together to provide you with a good answer to your question.

Second, for those you who would prefer not to use the microphone, it provides you an opportunity to ask your specific question and get an answer.

So if you prefer to use the microphone, we ask that you please ask one question at a time and allow the person responding to answer one question before we move on to another question.

After the question and answer period for each proposed plan, as I mentioned there will be an opportunity for people who wish to make official oral comments for the record on that proposed plan.

This part of the meeting provides an opportunity for the panel to hear your thoughts on the proposed plans for those, for the remediation alternatives for that project.

We have projected times on the agenda for each of the three parts, for addressing each

of the three topics. These times can be adjusted to allow all citizens to provide comments who wish to do so; however, we would like as best as possible to keep on schedule just so we can talk about and answer questions for all the topics that we have on the slate tonight.

The comment period on these two projects began on January 13, and the 30-day -- initial 30-day comment period was slated to end on February 12. We have received a request for an extension of that comment period for both proposed plans, and while the official notification has not been put out, we will be granting that request. Therefore, the end of the comment period for both the TAN injection well interim action and the unexploded ordnance interim action will be extended through March 13.

As I mentioned earlier, one of the purposes is to get to provide you an opportunity to express your thoughts and concerns about these plans to the agencies. If you choose not to do this at the meeting, you still have the opportunity of providing written comments.

You can provide written comments

however you would like. We have provided one avenue for that at the table at the back of the room. We have different -- we have comment sheets if you would like to do them with specifically the name of the project at the top of it.

The bright yellow sheet is for official comments on unexploded ordnance interim action, the blue sheet is for comments on the TAN injection well interim action, and the goldenrod or beige sheet is for comments for scoping the TAN groundwater contamination.

We also have a form at the back of the room, an evaluation sheet. Following this meeting or before you leave, if you'd like to take one to help us in designing future meetings and meeting future other needs for public involvement.

What happens to your comments after you've made them? After the comment period on the proposed plans has ended, we will summarize the comments that we receive and the comments will be addressed in what's called a Responsiveness Summary. This is part of the actual Record of Decision which documents the

actual cleanup alternative that is finally chosen to implement the cleanup, each of these cleanup projects.

Those of you that sign the attendance list tonight or submit written comments and provide a return address will be sent a copy of the responsiveness summaries and the records of decision. And those summaries will also be available in the information repositories when they are completed.

You may have noticed that we have a court reporter here tonight. The court reporter will be preparing a transcript of tonight's meeting for the proposed plans and this will be in the information repository also, along with the Responsiveness Summary.

To help the court reporter, I'd like to ask that you speak clearly into the microphone and be sure and provide your name and address for the record. If you give official comments more than once, each time you come to the microphone, please restate your name for the record.

Before Donna starts her presentation on the ordnance project, I'd like to ask, if possible, for expedience sake, I guess, if you

could try to hold any clarifying questions that you have until the end of the presentation; but by no means -- you know, if the question is -- the information is critical to you understanding the presentation, please feel free to raise your hand.

And as you listen to Donna's presentation, feel free to write down questions that come to your mind on the note cards to be handed to the panel and addressed then following the presentation.

With that, I'd like to present Donna Nicklaus.

MS. NICKLAUS: Thank you, Lisa.

As Lisa said, my name is Donna Nicklaus, I'm the DOE project manager for the unexploded ordnance project.

What are ordnance? Ordnance are military weapons or ammunition, examples being bombs or artillery shells.

The ordnance at the INEL are primarily the result of activities of former Naval Proving Ground area. This area was utilized primarily during the World War II era prior to the inception of the INEL.

These activities in these area involve artillery test firing and explosive storage bunker testing.

These activities have resulted in a variety of unexploded ordnance and contaminated soils at the INEL.

To give you a few examples of some ordnance that have been found in the past at the INEL, this is a picture of a three-inch unexploded artillery shell. The "three-inch" is referring to the diameter of the shell.

This is another unexploded artillery shell, this one being about a five-inch shell.

There are also many partially exploded ordnance or fragments of ordnance scattered around that have been found at the INEL in the past. This is an example of some pieces of high explosives that have been left on the soil from an exploded ordnance.

This is a picture of a partially exploded artillery shell. You can see again inside the shell there's chunks of high explosives, then around the soil scattered around you can see evidence of actual explosive compound residuals in the soils.

These soil contaminants include TNT, RDX, which are two common military explosives which have been listed by the EPA as possible carcinogens.

Why are we performing an interim action in these ordnance areas? Purpose of the interim action is to reduce, control or eliminate the risk proposed by the areas.

In this case, the risk is potential detonation of the unexploded ordnance and the contaminated soils which are contaminated with high explosive residuals.

Another purpose of an interim action is to expedite the overall site cleanup by taking an early action wherever possible.

This interim action meets both of these objectives. In this interim action, we have concentrated on six areas which are within the Naval Proving Ground area. These six areas are primarily -- or these six areas are near facility areas or areas frequented by site personnel.

You will also note there are three areas shown on the map which are outside of the former Naval Proving Ground area. These areas are listed as suspected ordnance areas. Ordnance

have been found there in the past. However, the knowledge of these areas in terms of the size, the types of activities that occurred there and the hazards present are not well quantified; therefore, there's not adequate information available for taking the remedial action at this point.

I'll go through each of the six identified areas and tell you where they're at and describe what types of ordnance are found in those areas that we'd be looking at in the interim action.

The first area is in the Central Facilities Area out at the site. It's a gravel pit. There's known to be one five-inch artillery shell buried beneath a slumped gravel pit wall in that area.

The second area is a ten-acre site just north of the chemical processing plant, this being the northwest border of the chemical processing plant area here. The ten-acre area, there's two storage bunkers within this area, and primarily antitank mines and five-inch artillery shells have been found in this area in the past.

The third area is a five-acre area

where the National Oceanic and Atmospheric Administration performs research at the INEL. This area has been known to contain chunks of high explosive residues such as in the photo I showed you earlier and five-inch artillery shells.

The forth area is a 20-acre area near Central Facilities Area, where Naval artillery testing took place. This is the gravel pit I showed you earlier. This 20-acre area is primarily this area where a lot of the artillery test firing originated from.

I will note that this area where there are buildings, et cetera, was surveyed prior to construction. We would be concerned mostly with the area surrounding that.

Fifth area identified in the proposed plan is a ten-acre area near an INEL fire station, the area would extend on just outside of the photo, where ordnance and antitank mine debris has been found. They've found live antitank mine fuses and one antitank mine in this area.

The sixth area proposed for the interim action is a 118-acre area along a ten-mile

stretch of Power Line maintenance road. This road is used for maintenance crews going out and checking on the power line.

Various ordnance and pieces of ordnance, mostly five-inch artillery shells, have been found in this area in the past.

For the remediation of these six areas, we've evaluated four alternatives. I'll just go through these alternatives here.

The first alternative looked at is no action.

Alternative 2 involves the placement of administrative barriers, such as fences and signs in ordnance areas.

Alternative 3, the preferred alternative, is detonation of the unexploded ordnance with burial -- or disposal on site of the nonhazardous portions of the ordnance, and off-sight incineration of any contaminated soils.

The fourth alternative is detonation of the unexploded ordnance with disposal on site followed by on-site composting of contaminated soils.

I'll go through briefly and look at a bit more detail at each one of the alternatives,

then I'll go through and show you the comparison of the alternatives based on the nine Superfund criteria.

First alternative is no action. Essentially, the hazards remain in place, the unexploded ordnance are not removed, contaminated soil is not removed, there is no reduction of risk presented by this alternative.

Second alternative is placement of administrative barriers, in which we would place signs or fences in areas identifying to people the potential hazards. And again, as in the no-action alternative, all hazards would remain in place.

Third alternative, again, the preferred alternative, involves a phased approach in which we would go through a four-step process to meet the overall remediation of these six areas.

The first step or phase in that approach involves a search of historical records Department of Defense, Naval Proving Ground records. It would be a comprehensive search. It would not be limited to the six identified areas. It would incorporate the entire Naval Proving Ground area and the three suspected

ordnance areas.

Also during phase one we would post signs on any public roads which cross ordnance areas.

After the historical records search is completed, we would move into phase two and go out and do actual ground searches for ordnance. So it would involve use of visual and physical means, such as using a metal detector in your backyard or at the beach. Go out, find the ordnance, mark them.

After they've been marked and located, we would go out and use controlled detonation of the ordnance.

Once the ordnance have been detonated, we would move into phase three, which involves the systematic soil sampling analysis and removal of contaminated soils identified above the action levels. Any soils removed would be containerized and transported off site for incineration of the soils.

Alternative 4 is a phased approach, much like Alternative 3. The first three phases are the same as in Alternative 3, the difference in Alternative 4 being instead of incineration

for phase four, composting of the contaminated soils on site would be proposed.

This composting would be much like a municipal leaf composting or a farmer's compost pile out on a farm.

The reason Alternative 4 was not selected as the proposed alternative is that composting is not a proven technology for high-explosive-contaminated soils.

Move into the evaluation criteria. When we get into the evaluation criteria, you compare the alternatives to each other and that allows you to make your decision on which alternative is the preferred alternative.

There are two criteria that are threshold criteria. If an alternative cannot meet these criteria, it is not considered for further analysis.

Alternative 1, the no-action alternative, did not meet these criteria, therefore, did not get into discussing the balancing criteria. It was not considered for further analysis.

There are five balancing criteria and I will show you a slide in just a minute and

discuss those and show you how the alternatives compare to each other.

There are also two that are considered to be modifying criteria. These are State acceptance. As Shawn discussed earlier, the State has been involved in the preparation of this proposed plan and agrees with its issuance. The other criteria is community acceptance.

We cannot evaluate community acceptance at this time. It will be evaluated in the Responsiveness Summary of the Record of Decision, which will be prepared after the end of the public comment period.

Go into the five balancing criteria now and show you how the alternatives stacked up against each other.

Based on these five criteria shown here, Alternative 3, as you can see, clearly stacked up to have the best rating. That's why it was chosen as the preferred alternative.

Alternative 2, administrative barriers, was not selected as the preferred alternative, because in terms of long-term effectiveness in reduction of toxicity mobility or volume through treatment, it was not effective in that there was

no treatment, all hazards remained in place.

Alternative 4 was not selected as the preferred alternative due to a very poor implementability. As I said, the composting technology has not been proven on a large scale for high-explosive-contaminated soils.

Alternative 3 involved incineration. It's a proven technology, has been shown to work in the past, is readily implementable.

In summary, the comparative analysis showed that Alternative 3 eliminated the significant risk in that the ordnance will be detonated and contaminated soils removed and will be readily implementable using existing technologies.

In order that we can address the public community acceptance, we'll take verbal comments tonight during the public comment period, we'll also be taking written comments until the end of the public comment period which has been extended through March 13.

Just to close, letting you know what's coming down the road next, as I stated, public comment period will be ending March 13. After that we will address public comments and prepare

the Responsiveness Summary, followed by issuing the Record of Decision early in the summer. We will then begin to prepare the remedial design, finish that up in the spring of '93, and begin remedial action that summer.

With that, I'd like to turn it back to Lisa.

MODERATOR GREEN: Thank you, Donna.

Are there any questions of clarification that you'd like to ask about Donna's presentation before we open it up to more general questions about this project?

Yes, sir.

AUDIENCE MEMBER: So far you have covered a lot of your five-inch 38, which is surface exposure. Has there been any consideration to anything there that's done as far as the 14-inch shells that were fired during the war?

I was at the Pemberton shipyard when we sent a lot of the stuff down here for testing. I know there's a lot of 14-inch shells that are buried. Has there been any proving as to what's underground? I know the concrete targets stopped a lot of it, but there was a lot of it wasn't.

And the range is considerably a lot further than your five-inch 38's. As a matter of fact, you've got miles. You've got beyond Terreton.

MS. NICKLAUS: In terms of any subsurface ordnance, the geophysical search would involve using some sort of instrument, such as a metal detector, to detect below-surface ordnance.

In terms of the range being larger than what we are looking at, yes, it most certainly is. We're going out and addressing six areas that are near areas that have known hazards and are near areas frequented by site personnel. We are also doing a comprehensive record search which will cover the entire Naval Proving Ground and other ordnance areas.

We have further actions down the road, further mechanisms of looking at these areas in deciding what needs to be done.

MODERATOR GREEN: Any other specific questions of clarification on the presentation?

AUDIENCE MEMBER: What's the risk and probability of an accident if nothing's done?

MODERATOR GREEN: Can you address that,

Donna?

MS. NICKLAUS: In terms of risk of an accident, it's -- there have been incidents in the past in other areas, and Mr. Blood of the EPA has an article if you'd like to come up and look at it afterwards, where a artillery shell exploded, a World War II artillery shell exploded in a German village just recently. And I guess that's the risk if nothing is done is the potential explosion hazard in areas where personnel are frequenting.

MODERATOR GREEN: If the question is in terms of a quantitative calculation of that risk, I don't believe that has been done and I'm not sure that that type of evaluation -- Donna, I guess I should pose it to you if that type of evaluation would be done.

MR. LUSK: There hasn't been a risk assessment that's been done. The nature of the hazard does not lend itself to a CERCLA-type risk assessment. The only risk assessment that's been done -- you had a plan that refers to a risk assessment code. That type of assessment is a qualitative assessment of the risks that are present, and that is what we did to rank these

sites to determine that an action was necessary.

MODERATOR GREEN: Yes, sir.

AUDIENCE MEMBER: It might be money might be better spent elsewhere if there's such a low risk in a site since second World War, and I know of no incidence of an exploding ordnance. It's a low traffic area. You could maybe reduce risk to public health by improving the highways, taking a four-lane road to the site. It might be a better place to spend the money than searching for old ordnance.

MODERATOR GREEN: I believe that sounds like a comment and we would appreciate that comment being provided either orally during the official period or write it down on a written comment form if you would, please. If there's a question, did you want -- did you have a question in your comment that you would like more fully answered?

AUDIENCE MEMBER: Well, what started this problem?

MODERATOR GREEN: We believe there is, due to the proximity of these shells near areas frequent by INEL employees, that there is an inevitable risk, I guess, a risk. And there is

-- I don't know the way to quantify that risk, but due to their proximity to areas where employees go, we believe it's justified to do something about -- to control this risk.

And, Howard, I don't know if you would care to elaborate on the issue of World War II era ordinances that do go off many, many years later. I guess I'll turn that question over to Howard.

MR. BLOOD: If that was the implied question, then certainly I'm not an ordnance expert. I have spent some time dealing with ordnance in the past and it was I would say just by fortuitous coincidence that this article hit the paper about the time we were starting to discuss this issue. It has to do with the World War II vintage bomb that spontaneously detonated in a German village and caused some injuries.

And basically, military ordnance that the compounds have stabilizers in them that do deteriorate over a period of time, and also the casing deteriorate. And you can have, in fact, essentially a spontaneous detonation. Or there may have been some kind of a minor rumbling of a truck going by that triggered this one. There's

no record of anything happening that anybody can point a finger to, it just said this thing went off.

And it's an interesting coincidence that this came out just at the time that we were really getting involved in this project and the stuff is the same vintage.

So there is, in fact, a -- and again, it's not a risk that we can quantify, which may be what you're looking for.

MODERATOR GREEN: Yes, ma'am.

AUDIENCE MEMBER: On page 4 of the brochure you say the pathways for human exposure to these compounds, like TNT, are thought dermal absorption, ingestion and inhalation of contaminated materials. A risk analysis for these pathways will be completed.

Presumably, that is not the kind of qualitative risk analysis we're talking about here. Right?

MODERATOR GREEN: That is a separate risk analysis on soil contaminants. I believe the risk analysis we've been discussing is more for potential of the ordnance actually going off. It's a different -- you're correct, it's a

different type of risk analysis.

AUDIENCE MEMBER: And will that risk analysis be completed after your --

MODERATOR GREEN: No, it won't. In fact, we've got a question on a card that I just handed to Donna. If whoever has it over on that table would please read the question and provide an answer, please.

MR. LUSK: If you're talking about this question, it's, "Since the DOD risk assessment evaluation for the ordnance area is not in the Administrative Record, please explain the results of that evaluation and how it relates to the Superfund target risk range."

First of all, the risk assessment evaluation, I guess I'm not sure what they're getting at here, but the risk assessment code I referred to earlier talks about the qualitative risk of an accident happening at the sites, and it is now in the Administrative Record and is there for you to review.

As far as the risk analysis you're talking about, and I think that's what this question is getting at also, that risk analysis is now in preparation and we expect to have it

out for public review before the close of the comment period and it should be in the Administrative Record the first week of March.

That risk analysis will identify action levels and cleanup standards and these will be more in line with the Superfund CERCLA of methodology.

MODERATOR GREEN: Before we get too much further here, I need to repeat the process here for putting questions on note cards. It's perfectly fine for you to raise your hand, but for those of you who would rather not raise your hand and come up to the microphone, if you would write the questions on a note card and pass them to the end of the aisle and Reuel or his staff will pick them up and deliver them up here for us to answer.

Was there another question on another note card over there?

MS. NICKLAUS: Yes. The question is, "Were the contaminated soils composted or incinerated when the ordnance were originally exploded as part of the Naval Proving Ground test?"

No, no soils were treated during the

original Naval Proving Ground tests. This was prior to any knowledge of these type of hazards existing. No action was taken at this time.

Follow-up question on this card says, "If not, why must the soils be treated when the present ordnance are exploded?"

And this action, it's an interim action; however, we hope to make it a DOE policy to try to make an interim action a final action when possible. We hope to go there and treat the contaminated soils to put them in a range that is an acceptable risk. That is why we would be treating the contaminants during this interim action.

MODERATOR GREEN: I've got two questions here. One, "Where would off-site incineration occur?"

That would be determined -- maybe I ought to pass that one off to Donna.

Donna, can you address that? "Where would off-site incineration occur?"

MS. NICKLAUS: The actual incinerator has not been selected. That would be selected, the incineration, where the incinerator would be located, would be selected during the remedial

design phase of the interim action.

AUDIENCE MEMBER: (Inaudible.)

MODERATOR GREEN: If you're going to be speaking, I think we'll need to use the microphone, because the court reporter is having trouble hearing questions.

AUDIENCE MEMBER: Would it be a commercial incinerator or an incinerator at another DOE site? I mean, what's our range of options on that?

MS. NICKLAUS: Again, we're still considering potential options. We have not committed to anything. It would be developed during the remedial design phase.

AUDIENCE MEMBER: Does the soil necessarily have to be transported off site? Why not a small mobile incinerator or other such device and treat it right on site?

MS. NICKLAUS: The volume of soil we're considering in this interim action, the capital costs of bringing a mobile incinerator on site would not be -- would make that a nonfeasible option. The capital cost of bringing that incinerator on site for the volume of soil we're looking at would be way out of line versus taking

the soil to an off-site incinerator.

AUDIENCE MEMBER: But we're only looking at 185 cubic yards, which is a lot of dirt, but certainly isn't an enormous amount of dirt.

MS. NICKLAUS: Maybe -- Ann Tyson is in the audience. She's with Morrison-Knudsen. She could better address that.

MS. TYSON: It would be more cost effective to take this off site to an incinerator in the evaluation that we've done at this preliminary stage than bringing an incinerator on site. When we get into a later remedial action looking at more ordnance and the larger volume of soil, we will take a look at bringing an incinerator on site at that time.

MODERATOR GREEN: I guess I would like to offer that if you know of a lower cost unit than we've apparently been evaluating, please provide that in a written comment or an oral comment. If we've overlooked some available less expensive option here, please provide us with enough information that we can better investigate it prior to reaching a decision.

I have one written question up here.

"Is the Department of Defense paying for this cleanup? It apears" -- I guess -- "that it is the potentially responsible party."

Under federal facility policy, basically the agency responsible for a federal facility addresses and pays for any cleanup necessary within its borders. If we did choose to seek reimbursement from the Department of Defense, it all comes from the same pocket and that's the Federal Government.

So no, they are not -- the direct answer is no, they are not paying for the cleanup, but the United States Government is paying for the cleanup, regardless of which agency pays for it.

There was a hand? Yes, sir.

AUDIENCE MEMBER: Has a site survey been done as far as finding how much ordnance is there? Do you have any idea? It says 150 in here for 163 acres. That seems kind of small.

MS. NICKLAUS: There has been no survey actually completed; however, we have areas where they have found ordnance in the past and these estimates were based on what they have found in various site areas in the past when they have

gone out and cleared areas of ordnance.

MR. ROSENBERGER: I have a question here.

"How will action levels for cleanup of soil be established?"

And those will be established through the risk analysis performed, and any risk in excess of ten to the minus 4th, which is one in 10,000, would be an action level. I hope that answers your question.

MR. BLOOD: I've got one also here. It says, "Howard says the ordnance decompose with time. How" -- I guess -- "how long will it take before they are harmless?"

Maybe I didn't explain that quite as clearly as I thought I did.

The ordnance compounds consist of the explosive itself, and then there are stabilizers in those compounds. And what degrades is the stabilizer, and then you're left with essentially an unstable compound that -- the best analogy I can think of is that on a lot of the old westerns they're always running around being terrified of the sweating dynamite, and that's -- that is a real problem.

The stuff decomposes with time and becomes less stable instead of more stable. And to the best of my knowledge, this will not naturally degrade in any reasonable time frame.

We have found that, as I think Donna alluded to, there are natural organisms in the soil that will attack these compounds, because they are, in fact, organic, but it takes a tremendous amount of time for this to happen, particularly in this arid environment.

So you're going to have those compounds out there in an unstable state until they either decide to go or until they break down naturally, which can take many tens of years if not hundreds of years to do. It would just be existing biota that's there.

MODERATOR GREEN: Yes, sir.

AUDIENCE MEMBER: Has there any question been made of the Army Proving Grounds, the handling of explosives here in our very close neighbor city in the environs of Salt Lake City? They handle a lot of it there. How do they dispose of it?

MODERATOR GREEN: I guess either Donna or Howard, if you could address this gentleman's

question. I know that we have been working with at least EPA personnel who have experience at other military sites where this is a problem. I'll defer to Donna.

Donna?

MR. BLOOD: Okay. Donna waved her hand at me, so I'll take the first shot at it, then Donna can pick up the pieces.

The central organization that the Army has that handles this problem now is called USATHMA, which I'll take a stab at deciphering that, is U.S. Army Toxic and Hazardous Materials Agency, which comes under the Corps of Engineers now. And they are actively involved in remediating a number of sites for the Department of Defense. And they have the lead for all of DOD, not just the Army.

Their approach for unexploded ordnance areas that are similar to this, where, for example, you have an impact area from an old range, there is an unknown quantity of material there, unknown types, particularly during World War II, early World War II, we used a lot of stuff that was probably subspec.

And as a result of that, there's a lot

of concern about that. And there is a list of contractors that are available that USATHMA has developed to do this type of activity, and I'm sure DOE would probably pick up on what USATHMA has developed and follow through with that.

Does that meet the --

MODERATOR GREEN: I have a question.

"Is M-K the contractor for this project?"

At this time, M-K is a general contractor at the INEL that is functioning in much the same way that EG&G and WINCO are functioning in support of the environmental restoration program here. They are providing remedial design or remedial action contracting services for the program at the INEL.

Donna?

MS. NICKLAUS: I have a couple of questions here.

One is, "Why not use the research technology already available at the INEL, such as in-situ vitrification, for transport and other technological developments?"

I'm not exactly sure what this means. I would assume -- I think the question means why

isn't in-situ vitrification being used for treatment of contaminated soils.

Through incineration, we can reduce the volume of these contaminated soils using available readily-implemented technology and reduce the volume and therefore have a lower volume. If we used in-situ vitrification, we would be vitrifying a very large area for very small amount of contaminants in the area.

Second question I have is, "What is the now estimated range of final cost in today's dollars?"

The costs that were provided in the proposed plan for this interim action are the estimated costs for the completion of this interim action.

If more was intended by this question, I would ask for a clarification.

MODERATOR GREEN: "How can this be termed interim action when no risk assessment has been done showing risk to off-site receptors?", I believe that word is.

Two things. For an interim action, there is no quantitative risk assessment that is needed. One can just be the obvious risk or the

need or the use of an interim action to expedite a final action or simplify a final action. There is no requirement for a risk assessment to be performed other than a qualitative assessment of risk.

Secondly, and probably more important, is that risks to on-site populations can trigger interim actions. It's not necessary to show risk to off-site receptors to trigger an interim action.

MR. ROSENBERGER: This question says, "Is it not a higher risk to injury or death to handle or excavate this material than to leave it alone."

I think with this action we're looking at uncontrolled detonation versus controlled detonation, and as Howard has mentioned, there is a list of contractors with experience in doing this type of work, and it's pretty well proven, and basically, I think everyone would prefer to have a controlled situation where detonation occurs than to have it go off spontaneously.

And the second part of the question was, "What about a risk assessment?"

And a risk assessment is really not, as

Lisa said, not required for an interim action. In this case, I think the risk is clearly evident from the presence of unexploded ordnance.

AUDIENCE MEMBER: Excuse me?

MR. ROSENBERGER: Yes?

AUDIENCE MEMBER: I wrote that question and I think you missed the point completely.

There is a risk even for an experienced contractor to handle or dig up this material, search for it, or whatever. That risk versus the risk of doing nothing is my question.

MS. NICKLAUS: I can maybe clarify a little bit of what Shawn said.

There are many sites across the nation where there are ordnance left at the sites and there are many experienced contractors that are going in and cleaning up the ordnance at these sites.

It has been done at many sites across the nation and the risk has shown -- there has not been shown to be a risk in these areas that is larger than a possible uncontrolled detonation. There would be adequate safety procedures to ensure safety of the workers would be followed.

MODERATOR GREEN: We've got a couple more questions on cards here. At this time, we need to be thinking toward the period for receiving official oral comments on the ordnance proposed plan. It's been identified to me that no one has signed up to give official oral comments. If you have not signed up and you would like to present some comments for the record on this proposed plan, I'd kind of like to see a show of hands who wishes to give comments.

AUDIENCE MEMBER: Excuse me, I submitted a comment previously.

MODERATOR GREEN: Okay. I have that here. So we have one submitted comment and there were two other ones that wish to provide comments on this project?

Okay. With that then I would like to wrap up the question period with these remaining two questions and we'll get on to receiving official oral comments on this project.

This question is, "Is it not true that OSHA requires an employer to provide a safe work environment? These sites are 'frequented' by employees which will require cleanup by OSHA if not by other means."

In our assessment of immediate OSHA requirements, I do not believe that these ordnance sites are in the actual work -- immediate work environment, in terms of in offices or people working around them eight hours a day. Any time there is maintenance or any other kind of work where people have to -- would work directly in contact with them, obviously, they would be provided the necessary OSHA briefings and health and safety plan requirements and that sort of thing. We believe that the ordnances can be adequately remediated using this preferred alternative in this proposed plan.

Did we have one more?

Okay. With that I would like to begin the official oral comment period here comments on the record for this proposed plan.

Mr. Elliott, would you like me to read these comments for the record?

MR. ELLIOTT: Yes.

MODERATOR GREEN: Okay.

"Ordnance comments, Mr. Marion Elliott, Tetonia, Idaho.

"Number one. The interim plan should include the investigation of the 'suspected

#T1-0102

bombing areas.'

"Number two. If Alternative 3 is used as the interim plan, it should not preclude the use of Alternative 4 should the composting technology be advanced to a preferable level by the time of the final cleanup. With the public concern about incineration, the interim plan should include further investigation on composting for the final cleanup."

Is that correct the way I read it?

MR. ELLIOTT: Yes.

MODERATOR GREEN: With that I'd like anyone else who would like to provide oral comments for the record on the proposed plan for the unexploded ordnance location to please step forward to the microphone and state their name and address and provide their oral comments, please.

Doesn't appear that we have large number of comments; so, ordinarily we try to restrict it to five minutes per comment to allow everybody to present their comments, but we'll see how it goes.

MR. TANNER: John Tanner from Idaho Falls.

#T1-0102

#T1-0218

I certainly agree with the idea of locating and detonating any ordnance that's close enough to the surface that it could pose a hazard to a passerby, particularly things like mines.

As far as contaminated soil is concerned, where the soil is visibly discolored from contamination, it would seem to make sense to do something with that, either incinerate or compost, whichever is cheapest.

Where I think judgment will be required, and I hope that EPA and the State of Idaho as well as DOE will use judgment, as you get farther and farther, the contamination is less and less, and one should begin to ask oneself where's the point of diminishing returns as far as spending the taxpayers' dollars for the risk of anybody ever ingesting any of this contamination.

MODERATOR GREEN: Thank you, Mr. Tanner.

I need to probably reiterate for the record that if you would like your comment or question considered for the Responsiveness Summary, you either need to come forward to the microphone at this time or provide a written

#T1-03 11

#T1-04 12

#T1-05 13

comment to DOE by March 13.

Also, in general, we will not be responding to these formal comments tonight. If issues or questions arise as a result of these comments, then feel free to discuss with us during the break or later on after the meeting any issues that have come up that we were not able to clarify during this period.

Go ahead.

MR. HUTTERMAN: Lisa, Leonard Hutterman, Idaho Falls.

I was the construction coordinator on the FAST facility, and one of the things we discovered during construction was a three-inch shell and we discovered it using a pan, and so it tumbled through the earth as it was brought up and there was a lot of risk to myself and all the construction workers there. So I'd encourage you to move along quickly on this and not limit the program to just the items that are in these areas. #T1-0635 #T1-0702

MODERATOR GREEN: Thank you, Mr. Hutterman.

Is there anybody else who would like to provide oral comment on the unexploded ordnance

location interim action proposed plan at this time?

Okay, I encourage you all if you have written comments that you'd like to make to pick up a form at the back of the room if you like and please record your written comments and provide them to DOE by the March 13 end of the public comment period.

With that we'll take a break for ten minutes and we will return and discuss the TAN interim action proposed plan.

(Meeting recessed.)

REPORTER'S CERTIFICATE

STATE OF IDAHO)
) ss.
COUNTY OF ADA)

I, DENECE GRAHAM, Certified Shorthand Reporter and Notary Public in and for the State of Idaho, do hereby certify:

That said meeting was taken down by me in shorthand at the time and place therein named and thereafter reduced to typewriting under my direction, and that the foregoing transcript contains a full, true and verbatim record of said meeting.

I further certify that I have no interest in the event of the action.

WITNESS my hand and seal this 29th day of February, 1992.

Denece Graham
DENECE GRAHAM, CSR and
Notary Public in and for
the State of Idaho.

My Commission Expires: 4-17-94

PROPOSED PLAN FOR CLEANUP OF UNEXPLODED ORDNANCE

Public Meeting
Boise Public Library
Boise, Idaho
February 5, 1992
6:30 p.m.

PANEL MEMBERS:

Lisa Green, DOE-Idaho
Howard Blood, U.S. EPA
Shawn Rosenberger, IDHW
Donna Nicklaus, DOE-Idaho
Mark Lusk, EG&G

NANCY SCHWARTZ
IDAHO CERTIFIED SHORTHAND REPORTER
2421 Anderson
Boise, Idaho 83702
(208) 345-2773

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MR. TREMBLAY: My name is Rick Tremblay with the INEL Boise office, and I'd like to welcome everybody here this evening. I see a lot of familiar faces: Fritz and company from the Snake River Alliance, and Kathy from the office, and just lots of interested people. And I would especially like to recognize all the familiar faces and thank you all for coming and thank you all for coming, so consistently.

I know it's an effort to get here. Fritz, I know, is an entrepreneur and works real hard all day long, and yet he finds the time to come to these meetings consistently. I don't recall a meeting he hasn't been at. That kind of dedication is to be commended from citizens that really care and want to make a difference.

And so welcome all of you, and I appreciate everybody being here. I want to let you know too that the INEL Boise office is open to everyone. You don't have to make an appointment, the doors aren't locked, you don't have to go through security or anything like that. Just come on in. We have a public library that is loaded with information on the

INEL, lots of folks utilize it, and I would like to see it used even more heavily.

So, again, an invitation is extended to all of you.

AUDIENCE: Where is that located?

MR. TREMBLAY: Thank you. The office is located at 816 West Bannock, Suite 306, that's the third floor. If you know where Alexander's Men's Clothing is, it has the brown awning with the gold letters, just go in there and take the elevator up to the third floor and you'll find us. We're open from at least 8:00 to 5:00 -- well, actually 7:30 to 6:30 every day of the week.

We're here tonight to discuss the proposed plans where an interim action can reduce the contamination near the injection well and groundwater at the Test Area North that was used by the United States Air Force and the Atomic Energy Commission at the INEL, and also the proposed plan for cleanup of unexploded ordnance locations at the INEL Engineering Laboratory that was used during the World War II era as a Navy Proving Ground.

This is an effort by the Department

of Energy, the Environmental Protection Agency and the State of Idaho, particularly the Department of Health and Welfare, and the Division of Environmental Quality.

I would like to, at this time, turn the meeting over to Lisa Green. Thank you.

MODERATOR: Thank you, Rick. I would also like to welcome you to tonight's meeting. We're glad you were able to attend, and we look forward to a productive evening here.

Tonight I'll be wearing two hats. The first hat will be as a monitor to help direct traffic through the agenda and ensure that everybody has an opportunity to ask questions and make comments on these projects.

The second hat is that of DOE remedial project manager. And under that hat I will be helping to answer some of the questions on the project. I'd like to introduce the other people up front. To my far right is Howard Blood. Howard works for the U.S. Environmental Protection Agency out of Region Ten in Seattle. Howard is a project manager on the ordnance project that we'll be discussing tonight, and he'll be representing

EPA on all of the subjects here tonight.

To my immediate right is Shawn Rosenberger. Shawn works for the Idaho Department of Health and Welfare. He's the technical manager out of the Idaho Falls office for that department.

Also Ron Lane is sitting in the front row here. Ron works out of the Boise office of the Department of Health and Welfare. Ron will be up here on the panel during the discussion of the TAN projects.

At the other table is Donna Nicklaus. Donna works for DOE. She's the project manager on the ordnance project and other activities in Waste Area Group 10.

To her left is Mark Lusk, who is the project manager for the contractor EGG Idaho on the ordnance project.

To my far right, Brad Bugger, he is with the INEL Public Affairs Department and, as you know, tonight the topics of discussion are the ordnance cleanup project and the TAN groundwater contamination cleanup and interim action. If you have any questions that are outside the realm of environmental restoration

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or those specific projects, Brad will be happy to either provide you with answers or make sure you get answers to those questions.

Reuel Smith is at the back of the room. Reuel is our INEL community relation coordinator, and he can answer questions about information repositories or meeting schedules or other items of a general community relations interest.

I'd like at this time to provide an opportunity for Howard and Shawn to provide some opening remarks also. Howard.

MR. BLOOD: Thank you, Lisa. As Lisa said, I am representing EPA on all of these discussions this evening. I was directly involved in the development of the proposed plan for the unexploded ordnance and have a reasonable level of acquaintance on the two projects being discussed. If I'm not able to answer your questions on them, I can certainly get answers for you.

The EPA has been involved in developing these plans from their inception, and we believe that both of these plans represent a sound approach to the problems that

have been identified. These are interim actions that are being undertaken consistent with the Superfund Law and represent an attempt to minimize problems early on, which may, in fact, require further action later.

These are consistent with the Federal Facility Agreement Order that was signed by DOE, the State of Idaho and the EPA in early December. One advantage of some of these early actions is that it will help us to fine tune some of the processes that we are going to have to have in place to handle the large number of other actions that are envisioned under this agreement.

I am here primarily to represent your interest and to take your comments and give them the specific EPA consideration. The charter that we have is, in fact, in the Public Law for these meetings, and it is our responsibility under the law to certainly have these meetings, but it's a large responsibility as a public agency to do our best to serve you, the people, that we work for.

With that, I think I'll give Shawn a chance to put his part in.

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MR. ROSENBERGER: I'm Shawn Rosenberger. I'm the technical manager in Idaho Falls for the Division of Environmental Quality. The State has played a very active role in developing these proposed plans as well through the Federal Facility Agreement, and the State supports these proposed plans being presented to you tonight.

Let me remind you these are proposed plans. They do not represent final decisions by the three agencies involved. And tonight we're here to take your questions and comments and take them into consideration as we make our final decision.

If you want to discuss any of the proposed plans with me, you can call me at 525-7300 in Idaho Falls. I have some business cards on the back table there too if you want to pick some up.

In Boise the main contact is Dean Nygard. He's the INEL project manager for the State, and he ensures consistency between the Idaho Falls field office and the Boise central office.

With that, that's really all I have

to say. Tonight we're to invite and encourage both your questions and comments.

MODERATOR: Thank you, Howard and Shawn. We have two goals tonight. The first is to gather public comments on the interim action proposed plans. These plans represent recommended alternatives for cleanup at the injection well and ordnance locations. However, input received during this public comment period at this meeting and written comments received prior to the end of the comment period will be used by DOE, EPA and the State to then determine the final decisions on these cleanup projects.

The second goal is to give everyone an opportunity to ask questions and provide DOE with your thoughts about how to proceed on the broader issue of cleaning up groundwater contamination at the Test Area North at the INEL. DOE is just now beginning to develop potential alternatives and ways to address cleaning up this groundwater contamination.

Your input tonight, at this point in the project, can assist us in coming up with the best solutions. So if you take a moment to

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look at our agenda we'll walk real briefly through the agenda and run through some ground rules for how we're going to run the meeting and to allow everybody to have a chance to participate.

As you can see, the agenda is divided into three major topics. The first topic on the agenda will be the ordnance proposed plan for cleanup up of unexploded ordnance locations.

After a short break, the next topic will be the proposed plan on the injection well and surrounding groundwater at the Test Area North.

The last topic, then, will be scoping discussions, presentations, discussions for the Remedial Investigation/Feasibility Study at the Test Area North.

After presentations by the staff on each one of these, questions can be either submitted in writing using the note cards on the chairs that you have found, or you can come up to the microphone and use the microphone to ask your questions orally.

The note cards we use for two

reasons. One, it helps the person who is going to answer the question gather his thoughts for a second or two and be able to provide you with a better response. And secondly, some members of the audience would rather not use the microphone.

If you use the microphone, I just ask that you please try to go one question at a time, present one question at a time to the panel or to the person that you're addressing so that they have an opportunity to understand the question and formulate an answer.

After the question and answer period for each of these three topics, there will be an opportunity for those of you who wish to make formal oral comments on the two proposed plans.

Now, this part of the meeting provides an opportunity for the panel to hear our thoughts on the preferred alternatives for these projects.

We've projected times on the agenda for concluding the public comment sessions on each of these proposed plans. These times can be adjusted to allow all citizens who would

like to provide their oral comments. However, we put the projected times there to try to gauge and allow us to complete all the topics that we have projected for this evening.

The comment period on these projects began on January 13th and was to end on February 12th; however, we have received a request for a comment period extension, a 30-day extension on both comment periods for the projects.

We have not provided formal notification of the extension; however, we have agreed to the extension, so now the close of the comment period for the TAN Interim Action, Injection Well Interim Action Proposed Plan and the Ordnance Proposed Plan will now be March 13th. So any written comments received by March 13th will be addressed in the Responsiveness Summary and Record of Decision.

As I mentioned earlier, one of the purposes is to give you an opportunity to provide input about these proposed plans and alternatives. If you don't wish to present them orally, please submit them in writing. We've got some forms at the back of the room

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here and they are color coded with titles across the top, so if you'd like to provide formal written comment on the Unexploded Interimordnance Action that's the yellow sheet back there. If you would like to provide formal written comment on the TAN Injection Well, that's on the blue sheet. Then comments on the Scoping of the TAN Groundwater, we have a separate sheet on this pale yellow paper.

Of course, you can provide comments on whatever kind of paper you like, but we have these available for convenience.

What happens to your comments after you've made them? After the comment period on the proposed plans has ended, the comments are summarized and the agencies consider them, incorporate ideas as feasible into the -- not necessarily the preferred alternative, the idea is to get input into the project and the final cleanup action is identified in the Record of Decision. That final cleanup action may be the preferred alternative. It may be a modification of the preferred alternative based on public comment received, or it may be an entirely different alternative than was the

preferred alternative.

The Record of Decision documents the cleanup action that will be taken, and it includes a Responsiveness Summary which addresses how public comment was utilized in making the final cleanup decision.

Those of you that signed the attendance list tonight or submitted written comment and provided a return address will be provided a copy of the Record of Decision and Responsiveness Summary when it's available. Those will also be placed in the information repositories.

We have a court reporter here tonight. A transcript of tonight's meeting for the Proposed Plans will be prepared and will be in the information repositories with the Record of Decision and Responsiveness Summary.

To help the court reporter, please speak clearly into the microphone and provide your name and address for the record. We want to be able to record your comments as accurately as possible, so each time you come to the microphone for official public comments, please repeat your name. If you're just coming

to the microphone to ask questions, you don't need to state your name, you're welcome to if you like.

Before Donna starts her presentation here, I would like to ask that you please try to hold your clarifying questions on the presentation until the end. However, if the information is critical to you understanding the rest of the presentation, if it's critical to you, it's probably critical to somebody else, then it's perfectly all right to interrupt.

However to the extent possible, if you could perhaps write down questions that come to your mind during the presentation on your note cards so you won't lose the thought, and we can continue with the presentation, and we would appreciate that.

With that, we'll get on to the interesting part of the meeting, and I will present Donna Nicklaus.

MS. NICKLAUS: Thank you. As Lisa said, my name is Donna Nicklaus. I'm the DOE Idaho Waste Area Group 10 manager, which includes the ordnance interim action at the

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INEL.

What are ordnance? The conventional ordnance found at the INEL are military weapons or ammunition such as bombs or artillery shells. The ordnance that we have found at the INEL are primarily the result of activities which occurred at the former Naval Proving Ground area.

This area was used in the World War II era prior to the inception of the INEL. Activities which occurred here included artillery test firing and explosive storage bunker testing. These activities have left us with a variety of unexploded ordnance and contaminated soils at the INEL.

I'll show you several examples of ordnance and contaminants that we have found in the past. We have found in the past 3- to 16-inch artillery shells at the INEL. This is an example of a 3-inch in diameter shell here. This is another example of an unexploded artillery shell, this one being approximately 5 inches in diameter. There is also some ordnance which are partially exploded or fragments which have been scattered from

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explosions.

This an example of chunks of high explosive compounds and have been left from an explosion. Also found are the partially exploded artillery shells. As you can see in this photo, there are places where there is visibly contaminated soil from the high explosive compounds. The high explosive compounds that are found in the soil contaminants are primarily TNT and RDX, which are two common military explosives. These two compounds have been listed by the EPA as possible carcinogens.

Why are we performing an interim action on the ordnance project? The purpose of an interim action is to reduce or eliminate or control the risk present at the site, in this case the potential explosive hazard through the presence of unexploded ordnance and the risk presented by its potential exposure to contaminated soils. Another purpose of an interim action is to expedite the overall site cleanup whenever possible by taking an early action.

In this case this interim action

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would meet both of these criteria. This interim action will concentrate on six areas. These six areas are within the former Naval Proving Ground area. They are in areas which are frequented by site -- near or in areas frequented by site personnel. The six areas are indicated on the map here. They are near the Central Facilities Area, the chemical Processing Plant and Test Reactor Area for those of you familiar with the site.

You'll also note on this map there are three areas which are outside the Naval Proving Ground area. These three areas have been listed as suspected areas in that ordnance have been found in these areas in the past. However, the activities associated with these areas are not fully known nor is the size or the hazards present. Therefore, in this interim action it is not feasible to pursue remediation of these areas at this time.

I'll go through and show you the six identified areas, show you an aerial photograph of the areas and tell you a little bit more about what we have found in these areas in the past.

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The first area identified of the proposed plan is a gravel pit, which is near the Central Facilities Area. This gravel pit is known to have one 5-inch artillery shell buried beneath the slumped gravel pit wall.

Second is the 10-acre site just north of the Chemical Processing Plant. This is the corner of the Chemical Processing Plant Area here. Here the area we would be looking at is a 10-acre area around in here. There are two storage bunkers that were used by the Navy in this area. This area has been known to contain anti-tank mines and artillery shells.

The third area we're looking at in the interim action is a 5-acre area near where the National Oceanic and Atmospheric Administration conducts research at the INEL. This area has been known to have high explosive chunks as I showed you in the photo earlier and artillery shells in the 5-inch range.

The fourth area that we're looking at in the interim action, again this is near the Central Facilities Area, this is the gravel pit I showed you earlier. This is a 20-acre area, which was used by the Navy as an artillery

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testing area. This area has been known to contain 5- to 14-inch artillery shells including one 5-inch artillery shell in a French drain. There was also found chunks of high explosives in this area also.

The fifth area we would be looking at for interim action is a 5-acre area near the INEL fire station. This area contains ordnance and anti-tank mine debris.

The final area that we'd be looking at in the interim action is a 10 mile stretch along the maintenance road, a power line. This is a 118-acre area in which various ordnance and pieces of ordnance have been found.

We've evaluated four alternatives for remediation of these six areas. These alternatives include Alternative 1, no action. The second alternative is the placement of administrative barriers such as fences or signs in ordnance areas.

The preferred Alternative 3 involves detonation of the unexploded ordnance with disposal of non-hazardous portions on site followed by off-site incineration of any contaminated soils.

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The fourth alternative involves detonation of the unexploded ordnance on site and disposal of non-hazardous materials on site followed by the on-site composting of contaminated soils.

To go through here briefly and give you a better description of what each alternative involves, then I will go through and compare each alternative against the nine Superfund criteria.

Alternative 1 is no action. As I stated, no action involves just as it says, nothing is done, hazards would remain in place. The unexploded ordnance would remain as are. No contaminated soils would be remediated. This involves no reduction of the risk.

The second alternative, placements of administrative barriers involves placement of signs or fences in ordnance areas. Again, as in the no action alternative, the hazards remain in place.

The preferred alternative, detonation and incineration, involves a phase approach in which we would go through four steps to complete the process.

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The first phase involves a historical search of the Department of Defense and Naval Proving Ground records. This would be a comprehensive records search involving both the six areas we have identified and the entire Naval Proving Ground area and the three suspected ordnance areas. We would search records for all of those areas and come up with the best available information.

Also during Phase I we would post signs on any public access roads that pass through ordnance areas notifying the public of hazards present.

After the historical records search is finished, we would follow that with a ground search for ordnance utilizing both visual methods and ground penetrating methods such as metal detectors at the beach. Once the ordnance have been found and marked, we would go out and use a control detonation of ordnance.

After detonation we would follow this with a systematic soil sampling analysis and removal of any soils identified above the action level. Any soils removed would be

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containerized and transported for off-site incineration.

Alternative 4 is a phase approach. The first three phases are identical to Alternative 3. The difference in Alternative 4 being instead of incineration in Phase IV, would be composting of the contaminated soils on site.

This composting would be much like a farmer's compost pile or a municipal leaf composting operation.

The reason Alternative 4 was not selected as a preferred alternative is composting is not a proven technology on a large scale for high explosive contaminated soils.

To go through the nine Superfund evaluation criteria is how you compare the four alternatives to each other. There are two threshold criteria, protection of human health and the environment and compliance with federal and state environmental standards.

If an alternative cannot meet these two criteria, it is eliminated from further consideration.

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Alternative 1, the no action alternative, could not meet these two threshold criteria, therefore it will not be considered in the analysis.

In just a minute I'll show you a slide of five balancing criteria. I'll go through a comparison of Alternatives 2, 3 and 4 based on those balancing criteria to show you how we arrived at the preferred alternative.

Now, about the two modifying criteria, State acceptance as Shawn indicated in the beginning, the State has been involved in the preparation of this proposed plan and agrees with its issuance.

Community acceptance is the other modifying criteria. We cannot address that at this time. That's why we're here tonight is to get your comments. We will be accepting comments through the end of the comment period and will evaluate community acceptance during the Responsiveness Summary and the Record of Decision.

Now, I'll show you the slide with the five balancing criteria on it. This comparison of these five criteria is how we arrive at

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Alternative 3, detonation and incineration, as being the preferred alternative. As you can see, based on these five criteria, Alternative 3 clearly stacked up the best.

Alternative 2, administrative barriers, was eliminated because it did not demonstrate long-term effectiveness or reduce any toxicity mobility or volume through treatment because there was no treatment. The hazards essentially remained in place. Alternative 4, composting, was poor on implementability and that is not a proven technology for high explosive contaminated soils.

Incineration, Alternative 3, is readily implementable utilizing existing technology, and therefore was given the best rate in this category.

In summary, the comparisons shows that Alternative 3 eliminates the significant risk present by the unexploded ordnance and the contaminated soils in the six areas and is most readily implementable utilizing existing technologies.

In order that we can evaluate

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community acceptance, we're taking verbal comments tonight. During the public comment period, which will follow the question and answer portion of this presentation, we will also be accepting written comments until the deadline of March 13th, which is the end of the public comment period.

To give you a little preview of what is coming up next, after the public comment period ends on March 13th, we will begin to address the public comments and prepare the Responsiveness Summary.

This Responsiveness Summary will be included when the Record of Decision is issued this summer. It will be followed by a remedial design. The remedial design will be finished up in the spring of 1993 and actual remedial action will begin next summer.

That's it for me. I'll turn it back over to Lisa.

MODERATOR: Thank you, Donna. Before we take questions, I would like to explain a little bit about the note cards. If you have questions written on note cards, please pass them to the end of the aisle and Reuel and Eric

will collect them and bring them forward to us so we can give them to the appropriate person to answer the questions. For those of you who come to the microphone, please try to ask one question at a time so that we can provide an accurate answer to each question. Are there any questions of clarification about Donna's presentation that you would like to ask Donna?

AUDIENCE: I have several questions. First of all, when discussing the detonation on site, how actually -- do they go out and shoot at them? What is exactly done to detonate a piece of ordinance that is lying out there in the desert?

MR. LUSK: Normally, you use a subcontractor to come in who has explosive ordnance disposal experience. What they will do is put a charge on the piece of ordnance in question and it will be blown up in the desert and that would render them safe.

MR. BJORNSEN: Okay. But I would assume then that it also spreads whatever contaminants at the same time.

MR. LUSK: No, experience through the Department of Defense and the people who have

done this in the past this is a acceptable technology. And, no, it does not spread any detectable contamination farther, apart from where we're talking.

We will, however, do some field sampling around the detonation areas to confirm that. If we do detect something in the soil, we will remediate that just as we would the chunks that Donna has shown.

MS. NICKLAUS: To add on a little bit to Mark's answer, part of the interim action is remediation of contaminated soils. During detonation we want to minimize the amount of contaminated soils we would be producing. So appropriate measures would be taken to reduce the amount of soils that we would potentially contaminate.

MR. BJORNSEN: That would bring me to my next question. The preferred alternative includes off-site incineration. Now, is this something that can only be performed off-site or -- why off-site?

MS. NICKLAUS: We're proposing off-site incineration based on the amount of soil that we would anticipate happening. We've

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estimated 185 cubic yards of contaminated soil would be produced. To bring an incinerator on site for this amount of soil is not feasible. They do have mobile incinerators you can bring on site, but due to the large capital cost of bringing them on site, you need a much larger volume of contaminated soil to make that cost effective.

MR. BJORNSEN: Have you identified the location where this soil will be shipped to for incineration?

MS. NICKLAUS: We have not identified that at this time. That will be evaluated during the remedial design phase.

MR. BJORNSEN: Are there any dangers or concerns with the transportation of the soil to the incinerator site that would be included in this review?

MS. NICKLAUS: Any shipments to an incinerator would be in accordance with all EPA regulations. Once you take the waste off site, you must follow EPA regulations.

MR. BLOOD: If I could add to that. From other sites where we have worked with ordnance, it is highly unlikely that the

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quantity of ordnance compounds in the soil would be high enough so that the soil would be even considered a reactive waste.

MR. BJORNSEN: I would assume that with respect to the ordnance the immediate danger is actually to site employees coming in contact with the ordnance. That the environmental problems are of less concern at this point; is that correct?

MS. NICKLAUS: Yes. The primary force driving this interim action is the risk present to the INEL personnel.

MR. BJORNSEN: Those areas that you have chosen immediately for concern are those areas that personnel would be most likely to come in contact with the ordnance?

MS. NICKLAUS: Yes. These six areas are used by personnel either for research activities or maintenance activities.

MODERATOR: Is there anybody else out there who has questions.

AUDIENCE: I was at the hearing here in December on the first phase where the Rocky Flats mess -- you were here too.

MODERATOR: The Pit 9 meeting?

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AUDIENCE: Yes. One of the things that was brought out in that one was the limited funds even though they are beginning. I would like to ask Donna if there is adequate funding to proceed with this interim action or preferred action? And second, what is the time span we're talking about from start to finish once you get approved, final approval, to go ahead in your preferred alternative?

MS. NICKLAUS: The funds --

MODERATOR: We have identified and projected at this time adequate funding to carry out this interim action.

MS. NICKLAUS: In terms of the time frame from start to finish, as I indicated remedial action would begin next summer, and let me just look at the chart so I'm not misspeaking here.

The detonation, the remediation action would take place over a year to a year and half time frame.

MS. MESSENGER: I assume that there has been adequate environmental studies done on this incineration process, but I'm not real sure because there was nothing included in the

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packet about that. Is this a pretty standard procedure or what?

MR. BLOOD: Yes, it is a standard procedure. Ordnance compounds are organics. There is nothing particularly unique except that by their structure they are explosive. And at the concentrations that we're talking about there's essentially no risk of actual detonation when the soil is incinerated, and this will have to be an approved incinerator. The EPA off-site policy which follows, all CERCLA waste that goes off from a Superfund project has to go to an approved CERCLA disposal point. So this material will in fact go to a CERCLA approved disposal point. There are not a great number of incinerators right now that are approved to handle CERCLA waste. So the off-gas that would come, for example, essentially these break down into carbon dioxide in water and some nitrates.

MS. MESSENGER: Are you saying there is no environmental risk associated with incineration? Is that --

MR. BLOOD: Yes, I can safely say that there is no risk associated with

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incinerating this material in an approved incinerator. Now, open burning you might get something that you would not want to have released in the air.

MS. MESSENGER: So where are these approved incinerator sites?

MR. BLOOD: The only one I can specifically address right now, I know there is one in Chicago that could handle this type of waste.

MS. MESSENGER: But you still don't know where it's going?

MR. BLOOD: No.

MS. MESSENGER: But there is only one site that is approved?

MR. BLOOD: There is only one that I personally know of. There are multiple sites that handle CERCLA waste, but because this has the ordnance compounds in it, the real kicker on this is the fear, we have addressed this issue at other sites, and there is a fear which is not well founded in science, we don't think, that when you say you have something that's contaminated with ordnance, there is a fear that you're going to have a high enough level

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so it will not only burn, but it will, in fact, detonate. And we are addressing that on another site in Oregon at the Umatilla Army depot.

MS. MESSENGER: I guess then I would just have one suggestion as far as this goes, to include some more information on that in this packet so that -- because having read this and spoken about this with other people, that was the major question that I encountered with other people, the incineration process, and that's not addressed in this at all.

MODERATOR: If you would like to provide an official comment into the record that you recommend additional information on the actual incinerators and risks associated with, or whatever your comment is, provide it in the administrative record or other documents available to the public, please do so.

Yes, sir?

AUDIENCE: I would like to comment on incinerators. The process of incinerating soils has been and is done all the time. You can turn the rock, et cetera, combined with organics, combined with hazardous oil wastes,

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toxins of all kinds, you can turn it into red hot and burn off all of the organics that are involved. The reason there aren't many incinerators that are licensed to do that that is they just haven't had the call for it so nobody bothered to license it, but the technology is available everywhere.

MODERATOR: Did you have a question or did you want --

AUDIENCE: No, I just wanted to respond that there are a lot of incinerators that can handle this, they just haven't applied for that kind of license.

MODERATOR: Do I have any other questions about the unexploded ordnance?

AUDIENCE: I have a comment. I'm not too sure I'm grateful to the Navy for having left this legacy. And I hope that the Air Force isn't going to leave Idaho a similar legacy when they turn southern Idaho into a bombing range. And I hope that they don't -- that the Idahoans don't have this issue in the future like we're having to deal with now. I would like to make that point.

Second, is just who is this hazardous

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waste as you're talking about going to affect, what kind of traffic do you get in that area that would be affected by what is left now, unexploded or whatever?

MODERATOR: Donna, would you like to answer that?

MS. NICKLAUS: The primary people that would be affected are the site workers that would be out either doing research or performing other activities, maintenance activities in the areas where the ordnance are. They could be affected either by the potential risk of uncontrolled detonation of the ordnance or by the presence of contaminated soils.

AUDIENCE: It would seem to me that the Navy ought to pay for that problem. Looking at the finances here, it's $182,000 to take care of the second solution, and $2,300,000 to take care of the third. If I understand it, that's our tax money.

I think the Navy aught to pay for the folks who work there, and the problem that they are having to resolve. And there would be more risk by incineration to the workers than by just having locations noted where these things

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are. That's my personal feeling.

MODERATOR: I would like to interject one thing. It sounds like you are providing some comments here, and I just want to make sure that you understand if you want them entered officially into the record, that's the next phase after the question and answer period.

So if you want the comments that you have just made addressed in the Responsiveness Summary incorporated into the final decision, you'll need to restate them during the last 15, 20 minutes here of the discussion on the ordnance plan when we officially have the public comment receiving period, or else write them down.

I invite you to submit those comments. I would also like to add: Your comment about having the Navy pay for this, it will be out of the federal -- the United States taxpayer's pocketbook whether the Navy pays for it or whether DOE pays for it. So I think there is no free lunch in that regard.

AUDIENCE: I would like to ask the young lady which she would prefer; whether to

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have her freedom, because somebody did have that ordnance out there and train the people so that we can defend our country, or whether she would like to be under the foot of some dictator?

MODERATOR: I think we need to keep the questions to a technical nature, sir. If you would like to have that discussion during the break with her, if she wishes, that's fine, but if we could keep the questions to a technical nature up to the panel.

Yes, sir.

AUDIENCE: With respect to -- there was one little slight thing that came up that indicated there were suspected ordnance areas that would additionally be on just the areas that would be unsafe for site workers. I think it could be assumed then that there could be an awful lot more ordnance out there than we are aware of right now.

MS. NICKLAUS: Yes, sir. Part of the preferred alternative involves a records search, which would include the entire Naval Proving Ground and the three suspected areas. We would be hoping to better identify what

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activities took place in those areas, what hazards are associated with those areas, so that we can evaluate what, if any, action needs to be taken in those areas.

AUDIENCE: So now the money involved as listed here, the two million some-odd thousand dollars is primarily to take care of the identified -- covers the identified areas, so conceivably the costs could be well above and beyond this or --

MS. NICKLAUS: Yes, the money identified in the proposed plan is to take care of the remediation of the six areas, and everything else that is involved in that alternative including the records search, et cetera, that I went through when I went through the preferred alternative. If it is decided that any further action needs to be taken on other areas of the site, that would involve more money.

AUDIENCE: I guess one last question would be: Is the public allowed into any area that is suspected at this point of having ordnance on the ground?

MS. NICKLAUS: If you note on the

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map, two of the suspected areas do go slightly off the INEL borders. These areas, again, this is just a best estimate of size of these areas. We do not know the exact size of these areas that is why we're proposing to go out and post a sign so that in the event that these areas do actually go off the borders of the INEL, that the public would be aware of the hazards associated with these areas.

MODERATOR: Do we have any questions on note cards? I don't think we received one yet.

Reuel?

MR. SMITH: I haven't received any yet. If you have a card, hold it up. I'll be glad to pick up it.

MS. MESSENGER: I have one follow-up question to the finance question that Fritz asked. Conceivably there are more ordnance, is what you just said. So then the budget -- and you said earlier that there was enough to take care of this problem, so if there is more identifiable ordnance, will there still be enough money to take care of that in the future?

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MODERATOR: I indicated that we have projected that there would be enough funding, and you have to realize that these are out-years, that Congress has not actually authorized funding, so I can't say that we know we have the funding.

We have projected that we would have adequate funding for the present scope of the interim action. If we identify new scope, we'll have to do cost estimates and factor that into the out-year planning and be sure that we request enough money to do it.

AUDIENCE: Okay.

MODERATOR: Do we have any other questions before we open the formal public comment receipt period? Okay.

This next portion of the meeting is designed for you to provide your oral comments to DOE, EPA and the State regarding the ordnance proposed plan. This is also the portion of the meeting that will be used to put the Responsiveness Summary together with the written comments received.

So if you would like your comment or question considered for the Responsiveness

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Summary, please feel free to come forward for this part of the meeting to submit or to provide your oral comments or please be sure to submit written comments before the end of the comment period on March 13th.

We're going to be listening to your comments tonight, but in general we will not be responding to them tonight. They will be responded to in the Responsiveness Summary.

Now, if some issues or questions arise as a result of any comments that are provided during this period, please feel free to discuss them with any of us during the break. We don't want new issues that have not been addressed to arise during the comment period here and for people to walk away wondering what the heck that was all about and not get a chance to discuss it with us, so please feel free to do that after the official comment period.

For those of you on the panel, if someone makes a statement for which you would like additional information in order to be able to understand their comment, please feel free to ask for clarification. And I hope you all

understand that it is just an attempt to find out exactly what the question is so we can integrate it into the cleanup decision process here.

Reul, how many people have signed up? We have two people who have signed up to provide oral comments. Is there anybody here who would like to provide oral comments that has not signed up? So we have three total people at this point in time.

Okay. I'll just take volunteers for the first person who would like to provide oral comments.

AUDIENCE: Fritz Bjornsen, Boise, Idaho, and representing the Snake River Alliance. My concerns with respect to the ordnance -- well, to begin I would like to say certainly that we're glad to see that the work is proceeding and hope that the ordnance is cleaned up, and that the dangers to both the site workers and the public is reduced as well as the environmental hazards associated.

I would like to see as part of the scope of this cleanup more information on off-site incineration including transportation

#T2-0114

#T2-0217

issues, more accurate descriptions of the volume and character of this soil, and with respect to the final burial, land filling or other disposition of the incinerated materials. I think that this is important as part of the documents. #T2-0217

Additionally, I would hope that the DOE and others involved with this would coordinate with the Navy and the local Idaho, for instance, either Gowen Field or the Air Force Base at Mountain Home with respect to ordnance detonation, disposal and incineration in the hopes that we could minimize both some of the transportation and some of the other costs involved. #T2-0305

I would like to see a little bit more in depth on the full extent of the ordnance that is out at the site, although the areas that have been identified so far represent an immediate threat to or danger to site employees. #T2-0402

Certainly given the nature of the testing and this sort of thing, there is probably ordnance scattered out over a much, much larger area. And I think that it's

important to identify both what's out there and a little bit better identification of the full costs of dealing with that ordnance. This is certainly not to slow down the efforts to deal with the ordnance that's creating or presenting an immediate risk.

#T2-0402

With respect to the composting and/or microbe-reduction of the ordnance, although it is not a preferred alternative, I think that it would be nice to have a little bit more information on that regardless of whether or not that alternative is chosen.

#T2-0518

Additionally, and I guess last, I think we should have some kind of a time line that addresses the ordnance that goes beyond just that identified as being an immediate threat. We need to know how long it's going to take to take care of all of the other, not so much the immediate hazardous ordnance, but all of the ordnance that's on site. Thank you.

#T2-0636

MODERATOR: Thank you, Mr. Bjornsen.

MS. MESSANGER: My name is Deanah Messenger, and I'm also from Boise, representing myself. I also have concerns about the incineration process. I think that

#T2-0717

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if this is going to be a truly public -- include true public involvement, that more information on the incineration process needs to be submitted to the public in the form of these brochures that you offer, and that we need to be informed of the risk both to the public, the workers and the environment that's associated with regard to transportation and actual incineration. And none of that information is provided here. I think that it's important.

#T2-07
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And also with regard to Alternative 4, there is mention of a new and innovative technology in this pamphlet and then that's it. There is no explanation of what that new and innovative technology is. I think that is -- to be blunt, sort of insulting that it has not included what the technology is. And I think that needs to be included.

#T2-08
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That's all. Thank you.

MODERATOR: Thank you, Ms. Messenger.

AUDIENCE: I'm Elinor Cheney, I am with the League of Women Voters of Boise, but I have been asked to speak for the League of Women Voters of Moscow, who are unable to be

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here.

The League of Women Voters of Moscow protests the exclusion of northern Idaho from the public meetings on the RI/FS and the proposed plan to address groundwater contamination at the Test Area North and the proposed plan for a cleanup of unexploded ordnance locations at the INEL. The League requests that a public meeting be held in the north prior to the closing of the public comment period. #T2-09 09

The League finds that holding public hearings only in the southern part of the State violates the spirit of the community relations plan which defines the affected community as "interested citizens, public officials, agencies, groups and organizations in the State of Idaho." This is from your Community Relations Plan, September, '91, page 1. It is shameful that the Idaho Department of Health and Welfare should succumb to provincialism on an issue that clearly affects all of Idaho. #T2-10 08

The State of Idaho acknowledges the importance of public meetings to encourage public discussions on the cover sheet sent with #T2-11 09

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the January '92 Community Relations Plan Fact Sheet on these projects. Yet no provision was made to allow the more than 216,700 residents who live in the northern ten counties of Idaho, which covers over 20,000 square miles, ready access to personally participate in the discussion.

The League of Women Voters of Moscow knows firsthand the obstacles to public participation this exclusion presents. Our physical absence tonight speaks for itself. League members have had to spend hours on the telephone, in local meetings, and in informal contact with DOE just trying to gain access to the public discussions on Test Area North and ordnance. The flawed public participation process offered has severely detracted from the public's ability to understand and comment on TAN and ordnance.

The Environmental Protection Agency's apparent willingness to condone the exclusion of 216,700 members of the community is a keen disappointment to the League. What hope do the residents of northern Idaho have when the federal agency responsible for seeing that the

#T2-1109

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spirit of the community relations plan in Superfund is carried out agrees to exclude them in order to save the EPA time and money?

The League of Women Voters of Moscow has followed the INEL cleanup process for over two years. Prior to signing the Consent Order, the DOE included northern Idaho in the siting of public meetings. The League is shocked and dismayed to discover that when our own state and EPA join the team, we are excluded.

During the public hearings on the Consent Order, deficiencies in the community relations plan were noted. The public requested that section 3 of the Public comment Periods on page 19 include language that at a minimum, all public meetings and hearings will be held at the five cities housing the administrative records. In informal discussions with DOE and in a letter from the State, it has been suggested that the meeting sites be rotated to save money. The League of Women Voters of Moscow finds that any configuration of meeting sites must provide equal access to all state residents. Therefore, the League requests language in the

#T2-1109

community relations plan that guarantees at least one meeting on each project be held in the northern part of the state.

It has been proposed in informal discussions that video conference linkages be used to save the State and EPA time and money. The League knows as well as anyone that face to face interaction increased meaningful public participation. That is why you are holding tonight's meeting. We also know that the farther away from the people the bureaucracies are, the more important the person-to-person contact is. Therefore, the League does not support the use of video conferences if they are intended to replace face to face discussions between the public, the State, EPA and DOE in the northern part of the state.

In closing, the League again requests that a public meeting be held in north Idaho on TAN and ordnance prior to the close of the public comment period so that the League and all other interested members of the community may have the opportunity to ask questions and present comments. The League thanks the volunteer who is reading our testimony and

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#T2-1208

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regrets the system that denied us the opportunity to present and discuss our concerns in person. And I'll leave the written comments with you. Thank you.

MODERATOR: Do we have anybody else that would like to provide officially oral public comment on the ordnance location interaction proposed plan?

MR. BJORNSEN: Could I add one thing for the record to my comments? I forgot one small thing. Is that possible?

MODERATOR: You have had less than five minutes and there is nobody else in the way, so be my guest.

MR. BJORNSEN: Fritz Bjornsen. The only other thing I would like to see would be an indication as to how clean is clean, at what level or at what point it is determined that the job is done, and what the criteria or parameters of the cleanup actually are. Thank you.

#T2-13
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MODERATOR: With that we'll take about a ten minute break and begin again at a quarter to eight to discuss the TAN injection well interim action.

(A recess was taken.)

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ORIGINAL

PUBLIC MEETING

PROPOSED PLAN FOR CLEANUP OF UNEXPLODED ORDNANCE

February 6, 1992

6:40 p.m.

Burley Inn

Burley, Idaho

Meeting Panel:

MS. LISA GREEN, DOE-Idaho, Moderator

MR. HOWARD BLOOD, U.S. EPA

MR. SHAWN ROSENBERGER, Idaho Department of Health and Welfare

MS. DONNA NICKLAUS, DOE-Idaho

MR. MARK LUSK, EG&G

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MAGIC VALLEY REPORTERS
P.O. Box 611, Twin Falls, Idaho 83303-0611
Phone: 736-4014
Reported by Linda Ledbetter CSR, CP CM

I N D E X

MS. GREEN: If everybody could please find a seat, preferably up close. We have a very large room here tonight. I think you will find it easier to hear and communicate with each other if we can get as close as possible together here.

I'd like to welcome everyone to tonight's meeting. We are glad to be here in Burley. I am really excited to see the crowd that we have. Some new faces. We are glad you are able to attend, and we look forward to a very productive evening here tonight.

My name is Lisa Green. Tonight, I will be wearing two hats. First, I will be acting as a moderator for the meeting, directing traffic, directing questions and moving us through the agenda so that everybody has an opportunity to speak or ask questions as they wish to.

The other hat that I wear tonight will be that of remedial project manager for DOE-Idaho. In that capacity, I will be helping to answer your questions here on the panel-- on the projects that we are discussing tonight.

I'd like to introduce the other people up front here. On my far right is Howard Blood. Howard represents the U.S. Environmental Protection Agency,

Region 10 out of Seattle. Howard is the project manager on the ordnance project that we are going to be discussing tonight. He will also be representing EPA for the other projects at Test Area North that we will be discussing.

To my immediate right is Shawn Rosenberger. Shawn is the technical manager for the Idaho Falls field office for the Idaho Division of Environmental Quality, Department of Health and Welfare.

Also in the audience at this time is Ron Lane. Ron will be up here on the panel when we start discussing the projects at Test Area North. Ron works out of the Boise office of the Division of Environmental Quality.

In the front -- Where is Brad Bugger? Second row, Brad Bugger is the INEL public affairs officer here tonight. As you know, our topics of discussion tonight are the two cleanup projects at TAN and the one cleanup project on the unexploded ordnance locations.

If you have any questions that fall outside of those projects or outside of environmental restoration in general, but yet about the INEL, please contact Brad during the breaks or after the

meeting, and he will be glad to either answer your question or make sure you get an answer to it.

Reuel Smith is at the back of the room there. Many of you may already know Reuel. He's the INEL community relations coordinator. As such, he should be able to answer any questions about information repositories, meeting schedules or other general community relations questions.

At this time I'd like to provide an opportunity for Howard and Shawn to provide a few opening comments also. Howard.

MR. BLOOD: Thank you, Lisa. As Lisa said, I am here representing Region 10 of the Environmental Protection Agency. Idaho is one of the four states that is under Region 10, and we have been involved in these two proposed plans that are being presented for your consideration, from the inception.

We have helped develop the list of alternatives and believe that the preferred alternative that was presented in these plans does represent a sound approach to the problems that have been identified.

The interim actions -- and I want to emphasize that these two actions are what we term interim actions, which implies that there will be

follow-up to the actions at the TAN under these two plans. These interim actions are consistent with the Federal Facility Agreement/Consent Order that was signed between the Department of Energy, the state of Idaho and the Environmental Protection Agency in early December.

By initiating some of this work very early under the FFA, as we refer to it, we are really having a chance to not only demonstrate some action on the problems identified very quickly after the signing of the FFA, but also having an opportunity to work out some of the mechanics of how these processes are going to work between our three agencies.

I am here tonight to respond to the best of my ability to any questions that you present on these projects. Lisa pointed out that I was directly involved in developing the proposed plan for the ordnance cleanup, and I have a reasonable familiarity with the Test Area North injection well project.

If you ask me a question that I can't answer, I will defer to someone else on the panel, or I will get back to you with an answer from some of the folks back at our office that actually were involved in developing the plan from the start.

We are required to have these meetings

with the public under the terms of the Superfund law, and that certainly forces us to do these things; but I believe that it's probably prudent for us to do these things, anyway, because certainly Shawn and I work for agencies that work directly for you and are here to represent your interests.

So we are very interested in getting your comments on these proposed plans, and also hearing your questions. Because it's entirely possible that we think we have presented a good, clear plan that doesn't come across clearly if you haven't been involved in it from the start. With that, I will turn it over to Shawn.

MR. ROSENBERGER: Thank you, Howard. As Lisa said, I am Shawn Rosenberger, the technical manager in Idaho Falls for the Division of Environmental Quality. Through the Federal Facility Agreement, the state plays a very active role in developing these proposed plans. The state supports the proposed plans you are going to see tonight.

I want to remind you that these plans are proposed, and they do not represent a final decision by the three agencies involved. And our purpose here tonight is to get your input, hear your questions and comments. And we will take those into consideration

as we make our final decision.

With that, I just want to invite and encourage comments and any questions you have here tonight. And that's about all I have to say. Lisa.

MS. GREEN: Thank you, Howard and Shawn. I am going to spend a few minutes here talking about goals of the meeting and some general ground rules and how the agenda is going to flow, and we will try to get on to the heart of the meeting here as soon as possible.

So I will run through these. There are two desired outcomes for this meeting. The first is to gather public comment on the interim action proposed plans. The first plan that will be presented will be the one for unexploded ordnance locations at the INEL.

The second one will be for the interim action on the TAN injection well and nearby groundwater contamination. These plans represent recommended alternatives for cleanup for the injection well and ordnance locations, but they are not final decisions at this point.

Comments received during the public comment period, both at this meeting orally, during the specified times, and also written comments

received prior to the close of the comment period will be considered by all three agencies to determine the actual, final cleanup decisions for each of those.

The second major objective of this meeting is to give you an opportunity to ask questions and provide us with your thoughts about how to proceed with the broader issue of cleanup of the groundwater contamination up at the Test Area North.

Your input tonight at this phase in the project can greatly assist us in coming up with solutions and the way to proceed on reaching solutions for that groundwater contamination. If you take a minute to look at your agenda -- I hope you all picked up an agenda from the table at the back of the room -- you can see it's divided into the three major topics that we are going to discuss tonight.

The first topic is the ordnance -- cleanup of unexploded ordnance locations proposed plan. We will break after we are done discussing and receiving comments on that plan. And then we will discuss the proposed plan for the interim action on the injection well.

After we receive formal comments on that, we will have another very short break, and wrap up

the meeting with a scoping discussion on the Remedial Investigation and Feasibility Study of the groundwater beneath the Test Area North.

After the presentations by the staff on the two proposed plan topics, questions -- we will ask for your questions that you might have, and the appropriate member of the panel will respond and provide you an answer to that question.

We have got two ways of dealing -- of handling the questions. If you prefer, you may state your question orally. If you do that, we prefer that you step up to the microphone so that everybody can hear your question.

We also have note cards on all the chairs. If you would rather not use the microphone, you can write your questions on the note cards and pass them to the end of the aisle, and Reuel or his staff will pick them up and bring them up to the panel, and we can provide the questions to the appropriate panel member to answer.

If you use the microphone, we ask that you please ask one question at a time so that the answer can be clearly provided by a panel member. Then after the question and answer period on each of these proposed plans, there will be a formal period

provided for formal oral comments to be received on the proposed plans.

We have projected times on the agenda for receiving -- or to ending the public comment sessions, and these times can be adjusted to allow all of -- everybody to provide comments who wishes to.

Tonight, we'd like -- as a matter of practice, we have been limiting oral comments to five minutes. Anyone who has more comments that they would like to provide, written comments do weigh equally with oral comments.

While we are on that subject, I'd like to identify that we have -- written comments will be received on any kind of paper that you send them on. To make it a little easier, if you'd like, at the back of the room, we have specific forms for you to write comments on for each project.

On the unexploded ordnance interim action, we have the bright yellow paper form for you to write written comments on, if you like.

For the TAN injection well interim action, the blue form back there. And for any comments to assist us in scoping for the TAN groundwater contamination, there is a pale yellow

goldenrod form back there to make it a little easier for you to submit comments.

The comment period on these projects began on January 13th. It was projected to end after 30 days, or on February 12th. We have received a request for a 30-day extension to the comment period for both the TAN and the ordnance projects.

While we have not made formal notification through the newspapers regarding that, we have agreed to extend the comment period. So the comment period for both of these projects will now close on March 13th.

What happens to your comments after you have made them? After the comment period on the proposed plans has ended, the comments will be summarized, evaluated and summarized, both the oral comments received here tonight and the written comments received on or before March 13th. These will be addressed and ideas incorporated into the final decision as determined by the three agencies.

And then the comments will be formally responded to in a document called the Responsiveness Summary. This Responsiveness Summary is part of a formal Record of Decision that identifies the final cleanup decision for these projects. Those of you

that have signed the attendance list tonight or who submit written comments and provide a return address will be sent a copy of that Responsiveness Summary and the Record of Decision. The summaries will also be available in the information repositories.

We have a court reporter here tonight so that we can accurately record comments, questions, answers. A transcript of tonight's meeting for the proposed plans will be prepared and will be in the information repositories with the Responsiveness Summary.

To help the court reporter, please speak clearly into the microphone and provide your name and address. We may -- we want to be able to record your comments as accurately as possible. So each time you come to the microphone for formal comments on the proposed plans, please repeat your name. And she may -- she may also ask that you spell it if you have a difficult to spell name.

I'd also like to introduce to you -- We are ready to start the topic, the session on the ordnance proposed plan. With that, I'd like to introduce Donna Nicklaus. Donna is the project manager for all of the Waste Area Group 10 activity, cleanup activities in our program, and therefore

she's also the project manager for DOE for the ordnance project.

To her left is Mark Lusk. Mark works for EG&G, which is the main contractor on the ordnance project. With that, Donna, if you'd like to begin your presentation.

MS. NICKLAUS: Thank you, Lisa. As Lisa said, my name is Donna Nicklaus. I am the DOE-Idaho project manager for the unexploded ordnance project.

First off, what are ordnance? Ordnance such as those found at the INEL are conventional military weapons or ammunition such as artillery shells, bombs or other.

The ordnance at the INEL are primarily a result of activities in the former Naval Proving Ground area. This area was utilized during the World War II era before the inception of the INEL. Activities in this area included artillery test firing and explosives storage bunker testing.

These activities have left a wide variety of unexploded ordnance and ordnance contaminated soils at the INEL. I will show you some examples of ordnance found in the past at the INEL. Unexploded ordnance found in the past include 3 to 16-inch artillery shells. This is an example of an

unexploded 3-inch artillery shell. The 3 inches referring to the diameter of the shell.

This is another example of an unexploded artillery shell, this one being 5 inches in diameter. We have also found ordnance which are partially exploded or fragments have been scattered around from exploded ordnance. This is an example showing some high explosives that remain laying on the ground at the INEL.

This is an example of a partially exploded artillery shell. You can see large chunks of high explosives remaining in the shell.

There's also areas of visibly contaminated soils surrounding the shell. The soil contaminants include TNT and RDX, which are two common military explosives. These have been listed by the EPA as possible carcinogens.

Why are we performing an interim action at the unexploded ordnance areas? The purpose of an interim action is to reduce, control or eliminate the hazards posed by the site. In this case, the hazards present are due to the potential detonation of the unexploded ordnance and the risk of exposure to high explosives contaminated soils.

The other purpose of an interim action is

to expedite the overall site cleanup by taking an early action whenever possible. This proposed interim action meets both of these objectives.

This interim action will concentrate on six areas which are within the Naval Proving Ground area. These six areas are in or near areas frequented by site personnel. Therefore, the purpose of the interim action is to reduce the risk present to those -- to site personnel in these areas.

You also note on this map there are three areas that have been identified outside of the Naval Proving Ground area. These areas are listed as suspected ordnance areas, in that ordnance have been found in these areas in the past. However, the activities associated with these areas, the size of the areas and other information about the hazards present in these areas is not available to take any remedial action at this time.

I will go through those six identified areas that are in the proposed plan, just give a brief description of the size of the area and what types of ordnance are present.

The first of the six areas is the gravel pit near the Central Facilities Area at the INEL. There is known to be one 5-inch artillery shell

buried beneath the slumped gravel pit wall in this area.

The second area is a 10-acre site just north of the Chemical Processing Plant, this being the north corner of the Chemical Processing Plant area here. As I said, it's a 10-acre site around two explosives storage bunkers that were used in Navy testing. There have been artillery shells and anti-tank mines found in this area.

The third area is a 5-acre area near where the National Oceanic and Atmospheric Administration conduct research at the INEL. This area is known to contain unexploded artillery shells and high explosives chunks such as the chunks of high explosives that I have showed you in the earlier picture.

The fourth area is a 20-acre site. This is the gravel pit I showed you earlier. This 20-acre area is near the Central Facilities Area. It was used as a support area for Naval artillery test firing. This area has been found to contain 3 to 14-inch artillery shells in the past. And that would be primarily what we would be looking for in this area. This area where the buildings and transformer are has been cleared in the past when the buildings

were put in.

The fifth area is a 10-acre area near an active INEL fire station. The area would extend off of the map here. This area has been known to contain debris from anti-tank mines and artillery shells.

The sixth area that we are looking at for this interim action is a 10-mile stretch of a power line maintenance road running out on the INEL. This area includes 118 acres where artillery shells primarily in the 5-inch diameter range have been found in the past.

We have evaluated four alternatives for the potential -- for the remediation of these six areas. These alternatives include, number one, no action. The second alternative is placement of administrative barriers such as signs or fences in ordnance areas.

The preferred alternative, number 3, involves detonation of the unexploded ordnance and disposal of nonhazardous components on site, followed by off-site incineration of any high explosives contaminated soils.

The fourth alternative is similar to alternative three in the detonation of the unexploded ordnance would occur with disposal on site. It

differs in that we would propose on-site composting of contaminated soils.

I will go through a bit more detailed description of each alternative. Then I will follow that up with a comparison of each alternative to the nine Superfund criteria that are shown in the proposed plan.

The first alternative, no action, is just what it says. The hazards would remain in place. The hazards being the unexploded ordnance and the contaminated soils. There would be no reduction of risk under the use of this alternative.

The second alternative would involve placement of administrative barriers at the ordnance areas. Barriers being any -- barriers being placed in the areas would include signs or fences identifying the hazards present and notifying people of the presence of unexploded ordnance. Again, under this alternative, the hazards would remain in place.

The preferred alternative, alternative 3, detonation and incineration, involves a phased approach in which we go through a step-by-step process to complete the overall remediation of the ordnance areas.

The first phase of this alternative

involves a search of all historical Department of Defense and Naval Proving Ground records. This records search would include not only the six identified areas, but also the entire Naval Proving Ground area and the three suspected ordnance areas.

It would also in phase 1 post signs on any public roads that cross ordnance areas, again identifying the presence of ordnance and the hazards associated.

Once the records search is completed, we would move into phase 2, which involves a ground search for the ordnance, using methods such as a metal detector like you would use at the beach or in your back yard. Once the ordnance have been found and marked, we would go out and begin controlled detonation of the ordnance.

After detonation has taken place, phase 3 would begin. This involves going out and systematically sampling any soils in areas where detonation has occurred or where we have identified, visually, contaminated soil areas; and after analysis, removal of any soils contaminated above the action level. Any soils removed would be taken off site for incineration.

Alternative 4 is a phased approach very

similar to alternative 3. The first three phases are identical to alternative 3. Phase 4 differs in that instead of incineration, composting of the contaminated soils on site is proposed. This composting would be much like a farmer's compost pile or municipal leaf composting.

Composting technology for high explosives contaminated soils at this time is not well developed for a large scale -- is not well developed for large scale use. It is still undergoing research and testing.

Now I will move into the nine evaluation criteria in which you go through a comparison process of evaluating the alternatives selected against these criteria. And this allows you to select the preferred alternative.

The first two criteria listed here, protection of human health and the environment and compliance with federal and state environmental standards, are considered to be threshold criteria. If an alternative cannot meet these two threshold criteria, it is eliminated from further consideration.

Alternative 1, the no action alternative, did not meet these two threshold criteria.

Therefore, when I go through further comparison of the alternatives, you will see that alternative 1 is not considered.

The next five criteria are considered to be balancing criteria. I will show you a slide in just a minute comparing alternatives 2, 3 and 4 against these five balancing criteria.

The other two criteria are modifying criteria. This includes state acceptance. As Shawn stated earlier, the state has been involved in the preparation of this proposed plan and agrees with its issuance.

The last criteria, community acceptance, cannot be evaluated at this time. It will be addressed when we prepare the Responsiveness Summary after the end of the public comment period. That Responsiveness Summary will be included as part of the Record of Decision.

I will now go into the five balancing criteria and show you why alternative 3, detonation and incineration, was selected as the preferred alternative.

Based on these five criteria shown here, you can clearly see that alternative 3 stacked up with the best overall rating. Alternative 2,

placement of administrative barriers, was not selected in that it demonstrated a poor long term effectiveness and poor reduction of toxicity, mobility or volume through treatment in that there was no treatment. The hazards were remaining in place.

Alternative 4, detonation and composting, had a poor score on implementability. This technology is still in the developmental stages and is undergoing research for use on high explosives compounds.

In terms of implementability, alternative 3, incineration, is readily implemented using existing technologies. In summary, this comparison has shown that alternative 3 eliminates the significant risk present due to the unexploded ordnance and the high explosives contaminated soils, and is the most readily implementable using existing technologies.

In order that we can address the ninth criterion, community acceptance, we are taking written and verbal comments on the proposed plan for the interim action. Written comments will be taken until the end of the public comment period, which ends on March 13th. Your verbal comments will be

taken tonight following the question and answer portion of this presentation.

I will show you what's coming up next. After the end of the public comment period on March 13th, we will begin to prepare the Responsiveness Summary, which will address any questions raised during the public comment period. Then the Responsiveness Summary will be issued this summer in the Record of Decision.

We will then begin to prepare remedial design with remedial design finishing up in early 1993. And moving into remedial action at the six ordnance areas next summer. That concludes my presentation. I will turn this back over to Lisa Green now.

MS. GREEN: Thank you, Donna. I'd like to -- This portion of the meeting is for you to ask questions about the ordnance project. Any questions you might have, I'd like to take them and point them to the respective panel members who can best answer them.

If you do have a specific question that you would like EPA or the state to answer, please indicate that in your question. And as I mentioned before, you can either use the microphone or write

your questions on a card and they will be brought up to the front. With that, do we have anybody who has questions?

MR. BELLEM: I am Clarence Bellem, commissioner of Minidoka County. I'd like to ask Lisa this question and talk about incineration in your third alternative. Why can't you incinerate that material on site? You have sources of energy there, both coal and nuclear. Why can't you incinerate it there instead of transporting the material outside, which would be expensive in that process, also.

MS. GREEN: Donna, can you answer that question?

MS. NICKLAUS: There is no operating, licensed incinerator on site right now that would handle the high explosives contaminated soils. That is why we are proposing off-site incineration.

Your second question, could we design an incinerator. We could bring an incinerator on site for incineration. This is done in other projects. However, the volume of soil that we are proposing -- or that we estimated would be remediated, 185 cubic yards, is too small to make it economically feasible to bring an incinerator on site. You need a much

larger volume of soil for that. And it's a high capital cost to bring an incinerator on site.

MR. BELLEM: Are you anticipating just 185 yards over the total complex you have out there or is that just one sample?

MS. NICKLAUS: We estimate 185 cubic yards of contaminated soil for the six ordnance areas that we have identified to include in this interim action.

MR. BELLEM: Thank you.

MS. GREEN: I don't know, Donna, do we want to add that this is just the first part of cleanup of ordnance on the INEL. This interim action represents just the first step in cleanup of those locations. It is possible that when we address the magnitude of the rest of the ordnance sites that it would make it more feasible to include an on-site incinerator. Yes, sir.

MR. HAWKINS: I am Lee Hawkins. I was -- I am impressed with the alternative 3. I would vote for it.

MS. GREEN: We appreciate -- thanks for the comment. If you would provide that comment during the official comment period after the questions, it will get entered into the record. Thank you. Do we have any other questions? There's

a lot of people out there. We ought to have some questions.

MS. NORTON: Nan Norton, Burley. My question is you used the word "we" as in cleaning it up, that means -- are we talking about DOE?

MS. NICKLAUS: DOE in terms of cleanup. However, this is a tri-party agreement, and the EPA and state are involved in this and have been involved in the development of this.

MS. NORTON: My other question is why isn't the Navy being brought back to clean up their mess?

MS. GREEN: Under the federal facilities approach to Superfund, generally the agency that owns that facility takes responsibility for the federal government. I mean if the Navy took charge of it, it would still be federal tax dollars paying for it. It comes out of the same pocketbook either way. Under the general federal facilities policy, that the facility that owns -- or the agency that owns the facility manages the cleanup.

MS. NORTON: So are we talking about new money that has been set aside for this or will be set aside for this, or is this money that was set aside when the proving grounds was around? Specifically

for cleanup, we are talking about new money?

MS. GREEN: We are talking about money that would be authorized by Congress over the next couple of years.

MS. NORTON: Do you have an estimate of what kind of money we are talking about?

MS. GREEN: There are estimated costs in the proposed plan. Is that what your question is?

MS. NORTON: Yes.

MS. NICKLAUS: For the preferred alternative, alternative 3, the estimated cost presented in the proposed plan is approximately $2.3 million.

MS. NORTON: Thank you.

MS. GREEN: Any other questions? Can I ask is my mike working? Okay. It doesn't sound like it from here.

MS. SAMUELSON: Cindy Samuelson, Declo. I was just curious, when World War II has been over for 50 years, what made you decide all of the sudden that this needs to be cleaned up and why no one thought of it earlier.

MS. GREEN: Would you like to handle that one, Donna?

MS. NICKLAUS: Nothing was done in the

past, and I am not -- I guess I can't address why nothing was done in the past. We are here to go out and clean it up now. We feel that it does pose an unacceptable risk to the site workers in the area, and that's why we are pursuing this as an interim action for those six areas, and looking at doing a records search of the other areas so we can better identify what other areas need to be taken care of.

MS. SANDERSON: In follow-up to that: Have there been any instances, say animals being hurt or anything exploding or any specific things that have happened?

MS. NICKLAUS: There have not been any specific single incidents at the INEL in the past. However, there was one range fire, I believe, in the early seventies in which, due to the fire, many ordnance from the heat were set off and did detonate.

There have also been an instance at the site where personnel have come across unexploded ordnance or portions of ordnance. No actual detonation or incident took place. They notified the proper personnel and the ordnance was taken care of.

Mr. Blood, Howard Blood of the EPA also has an article, if you are interested afterwards, he could show you of an artillery shell that was of the

World War II era in Germany which just happened to detonate in a village unexpectedly.

MS. SANDERSON: Thank you.

MS. GREEN: Any other questions?

MR. LOVELAND: Glen Loveland from Heyburn. Has anybody -- I noticed when you were showing those things on the screen -- has anybody ever looked at the Big Butte? Is there anything at the Big Butte that is a hazard, that could possibly have not gone off yet?

MS. GREEN: Would you like to answer this, Donna, or would you like me to?

MS. NICKLAUS: It doesn't matter.

MS. GREEN: Go ahead.

MS. NICKLAUS: As you will note the area down towards the Big Southern Butte, there is a suspected area that goes off site down in that area. There have been ordnance found on site in that range in the past. We do not know the extent of that area based on available information, or have a good handle on the total activities that took place in the area. That's why we are looking at that within the records search.

Also, what we would do under the posting of signs on public roads, we would post signs on the

roads in those areas under the preferred alternative; and then after the records search, we would be better able to evaluate if further action is needed in those suspected areas.

MR. LOVELAND: Do you know of any unexploded material that is there?

MS. NICKLAUS: There is none that I --

MR. LOVELAND: At the Big Butte per se.

MS. NICKLAUS: There is none there that I am aware of, personally.

MR. LOVELAND: Has somebody gone there and looked, do you know?

MS. GREEN: We do not know that. That is why it's part of this interim action, where we will go out and do a search.

MR. LOVELAND: Part of the reason I am asking is because I lived in Arco for eight years, and I spent a lot of time out in that area, in the Big Butte. And I saw lots of shells out there.

MS. NICKLAUS: If you have information of that type, we'd love to get your name and address so we could contact you and get any information that you might have.

MR. LOVELAND: Okay. Thank you.

MS. GREEN: Ma'am, I believe there was

another person who was walking up to the microphone.

MS. MONDO: My name is Carolyn Mondo, and I live in Burley. I had a couple of questions, if that's okay. Since alternative 4 is so similar to alternative 3, I think that we should take some time and try to develop the composting before we send it away to our neighbors for them to take care of it.

And you know, if we have waited this long to clean it up, I don't see why we can't wait a little bit longer to see if composting can't be made feasible. Then if it can't, then go from there. But I really think that maybe composting of the soil should be looked at a little bit harder.

MS. GREEN: Is that your question?

MS. MONDO: My question is why aren't we looking at composting a little harder, I guess is my question.

MS. NICKLAUS: In terms of for this interim action, we have proposed the incineration because we felt that that was the most readily implementable technology in terms of getting the total remediation of these six areas completed. Composting may in the future become a viable technology for looking at other areas in larger contaminated -- larger volumes of contaminated soil. I think Howard could probably

talk to the rest of this answer better, in that the Department of Defense is working on developing that technology currently.

MS. GREEN: Howard, could you add to that discussion, please.

MR. BLOOD: I can just comment briefly, that we are working on some other sites within Region 10 that do have ordnance compounds in the soil, and the U.S. Army Toxics and Hazardous Materials Agency -- USATHAMA is the common acronym -- is sponsoring a great deal of research on ordnance compounds.

One of the big problems with bioremediation is that the bugs, the microorganisms are very sensitive to a lot of other contaminants that may be found in ordnance residue. For example, heavy metals tend to kill off most of the commonly found bugs that are in the native soil. And this technology is really, I would say, not quite ready to be presented as the preferred alternative.

MS. GREEN: And again, as we discussed with the on-site incinerator approach for later on down the line when we address the broader magnitude of the other ordnance locations, it may be a more feasible alternative at that time to address the

bigger picture of ordnance at INEL.

MS. MONDO: Okay. My next question is where is the off-site incinerator.

MS. NICKLAUS: That has not been determined. That would be determined as part of the remedial design activities that we would be doing.

MS. MONDO: Do you know what the choices are?

MS. NICKLAUS: It would be an EPA licensed incinerator that would accept high explosives contaminated soils.

MS. MONDO: I suppose there's a list somewhere, right?

MR. BLOOD: There are a number of permitted incinerators. The requirement for off-site remediation was, until 1986, subject to EPA policy that was referred to as the off-site policy. Basically, it says you can't take the problem off site just to get it out of the way. It can only be taken to a permitted facility that's permitted under CERCLA, the Superfund law, or the Resource Conservation and Recovery Act, the RCRA rules.

Congress chose to actually put that language, that requirement into the statute when they reauthorized Superfund in 1986. So that requirement

is part of the Superfund law and it will have to be a condition of getting this to any incinerator that chooses to bid on it.

Basically what you are looking at with this is the DOE is not going to select an incinerator, probably. They are probably going to get a contractor to take care of this entire project. And the contractor will go and get bids, and one of the conditions is they can't get a bid from anybody that's not a permitted incinerator.

So we won't direct where the stuff goes. It's just that they can't choose anybody or get a bid from anybody that is not permitted under CERCLA or RCRA.

MS. HONDO: Do you know where I would go to get a list of those?

MR. BLOOD: You could send -- or give me your name and address, and I can check into that and find out how many there are that are permitted. Basically, incineration, particularly of this type of material, is not a terribly demanding thing. I think that there is some implication that people get when we use the term high explosives. But high explosives just refers to the type of compound.

And this waste, when it goes off the

site, is at such a low level of concentration of the explosive compound that it is not an explosive. It is probably not even a high enough level to be considered a reactive waste under the RCRA rules. But if you want to give me your name and address, we can -- I could certainly attempt to put together a list or get someone in our office to put together a list for you.

MS. MONDO: And we were wondering -- Well, somebody was wondering about the detonation of the ordnances. Is that done right where it's at by, you know, frogmen or whoever does that?

MS. NICKLAUS: Yes. We would be using personnel who are -- who have done detonations in the past.

MS. MONDO: So it won't be moved?

MS. NICKLAUS: It will be done in place.

MR. BLOOD: That's the general policy. I believe there is one round that will have to be moved. But that is a standard practice; that anybody that's worked with military explosives will tell you that the standard policy is blow it in place, if you can, because it's too dangerous to move.

However, there is one round in the CFA area that's very close to a substation. Fortunately,

that's a fixed round and it probably hasn't been fired. The fuse probably hasn't been activated. But there are people that do this for a living that will have a chance to move that. But that is definitely the exception.

MS. MONDO: And then in your site description, you are talking about the Central Facilities Area gravel pit, and it states that this location is within 500 feet of a site proposed for future development. Can you tell me what that future development is?

MS. GREEN: Donna or Mark, do you know?

MR. LUSK: Yes. I believe they are investigating that area for a waste transfer station. Aren't they? When I say waste, I am talking solid waste that goes to CFA landfills. Not any hasards or radioactive.

Some of those buildings are also slated for demolition just because they are old and falling down and no longer good for people to be in there for offices or anything. So there will be heavy equipment going in there eventually in the next couple of years.

MS. MONDO: Thank you.

MS. GREEN: Thank you. Do we have any

more questions on the ordnance locations, unexploded ordnance locations proposed plan before we enter into the period of the meeting where we take formal comments on the plan to be entered into the record?

(No response.)

MS. GREEN: Okay, if we have no more questions, then the following portion of the meeting is designed for you to provide your oral comments to DOE, EPA and the state regarding the ordnance proposed plan. This is the portion of the meeting that will be used to incorporate public comments into this project and arrive at the final decision, the decision for cleanup.

And so comments that we receive during this period right here will be the ones that are addressed in the Responsiveness Summary and incorporated into the Record of Decision, along with those written comments which are received on or before March 13th. So if you would like your comment or question considered, officially, as part of this project, the next however many minutes it takes to take everybody's comments is the time to provide them orally. Otherwise, they will need to be provided in writing before March 13th.

Now, the panel will listen to your

comments. But in general, we are not going to respond to them tonight. They will be responded -- incorporated and responded to in the Responsiveness Summary and Record of Decision. But if issues or questions arise as a result of some of the comments that you hear that are provided in this period, please feel free to discuss them with us during the break or after the meeting.

And for those of you on the panel, if somebody makes a statement for which you'd like additional information so that you can fully understand the comment and address it, please be sure to ask the speaker for that clarification.

Reuel, how many people have signed up? One person has signed up to give official oral comments on this plan. Are there any other people who have decided, since they have signed in, that they would also like to provide official comments?

(No response.)

MS. GREEN: Well, with that, would you please step forward, if you would like to provide oral comments on the ordnance proposed plan.

(No response,)

MS. GREEN: Is that person still here who signed up to give comments?

MR. SMITH: I think Commissioner Bellem indicated he might have some testimony on that.

MS. GREEN: Did you wish to provide oral comments for the record on this plan?

MR. BELLEM: Clarence Bellem, again. I have one question in regards to -- I am not clear in my mind why some of the equipment that you have on site cannot be used to take care of this soil where it's just 185 cubic yards, which is about 200 truckloads, really.

You have vitrifying equipment on site that you use to vitrify soils that's been contaminated by radioactive material. Why couldn't that soil be exposed to this process? If you do nothing else but reduce it with the tremendous heat that you generate, you could probably vaporize that material that's in there, anyway.

#T3-0127

MS. GREEN: Thank you, sir. Is there anybody else who would like to provide oral comments for the record on the proposed plan?

MS. BRAILSFORD: Beatrice Brailsford, Pocatello, Idaho. And I guess this meeting -- I go to a lot of these cleanup meetings, and the meeting on this plan the other night in Idaho Falls and the meeting here tonight, we are getting a lot of real

#T3-0209

good questions and comments in the question and answer period.

For instance, the gentleman who has some information about the ordnance at Big Southern Butte. And I like the dialogue and being able to ask follow-up questions and have an answer right here so that -- to help us understand and to help you folks see our point.

But then we cut off and go into the formal part of the responsiveness. You know, what you have to respond to in the Responsiveness Summary, and we have all asked our questions. You know, we are human beings. That man is probably not going to stand up and make the Big Southern Butte comment again.

And I am not certain at all why the more formal comments and the comments made in the question and answer period can't all be considered as part of the Responsiveness Summary. Or that you must respond to it in the Responsiveness Summary. I think a comment from the public is a comment from the public.

Which does lead me into I am getting a little concerned about the responsiveness summaries themselves. They seem to be a little less than detailed. It seems to me that you are collapsing a

#T3-0209

T3-00002 (3)
T3-00003 (1)

lot of individual concerns into, you know, general headings. And sometimes I look at responsiveness summaries and forget that -- I can't tell what the answer to my question is, I can't tell even if you have answered my question.

So I think, certainly, you know, looking at these meetings, I appreciate the informality; but I don't want people to think, because they have said it to Lisa Green and she's a responsive person, that that means that the agency she represents must respond. So for openers, if anyone here asks a question or made a comment that you really do want a government agency or public agency to consider, you have to get up here again now and make it. Thank you.

#T3-02 09

MS. GREEN: Do we have any other official comments -- oral comments, I should say.

MS. NORTON: Nan Norton. My question was going to be do I need to ask the questions again to have them responded to. I am assuming I do have to do that now, to have them responded to in the responsiveness survey? Do I have to ask my questions again?

#T3-03 09

MS. GREEN: If you would like your question responded to in the Responsiveness Summary,

the way we have set it up is for you to ask them during this time, or provide them in writing.

MS. NORTON: I will put them in writing, and she won't have to type them all out again.

MS. GREEN: Would anybody else like to provide official oral comments on the ordnance proposed plan?

(No response.)

MS. GREEN: Okay, with that, again, to make sure everybody understands: The comment period does not end until March 13th. So if you think of something else or decide that the questions, the informal questions that we have discussed here earlier tonight, as Miss Brailsford said, if you'd like them addressed formally in the Responsiveness Summary, jot them down.

You can jot them down right here on the break that we are about to take, on the yellow form that's at the back of the room for unexploded ordnance interim action, and provide them to Reuel; and they will be not just addressed in the Responsiveness Summary, but hopefully incorporated in the final decision.

With that, if we could take about a 10-minute break before we start the TAN interim

action presentation. That would get us started at about 7:45. Thank you very much.

(Whereupon, the public meeting ended.)

REPORTER'S CERTIFICATE

STATE OF IDAHO)
) ss
County of Twin Falls)

I, LINDA LEDBETTER, a Notary Public and Certified Shorthand Reporter in and for the state of Idaho, do hereby certify:

That the foregoing meeting was taken down by me in shorthand at the time and place therein named, and thereafter reduced to print under my direction; and that the foregoing transcript contains a full, true and verbatim record of the said meeting.

I further certify that I have no interest in the event of the action.

WITNESS my hand and seal this 27th day of February, 1992.

Linda Ledbetter
Idaho CSR Number 26

My commission expires 10/12/94

000147

[redacted]

1/10/92

Dear Jerry Lyle

I would like to thank you for the information to the public on the Clean up of the wastes at the Inel. I agree with your selected Alternitive. Please continue to keep me informed & protect the resources we have in the State. Keep the Inel a place for the peaceful application of ~~[redacted]~~ nuclear energy not bombs.

Sincerely,
Roger Rosenthal

#W1-01
16

000148

CLARENCE F. BELLEM
Minidoka County Commissioner &
Agri. Counsulting Council U of ID.
Rt 1, Box 241, Rupert, ID 83350
Hm: 208-436-3733 Bus:208-436-9511

January 13, 1992

Mr. Jerry Lyle, Acting Deputy Assistant Manager
Environmental Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, Idaho 83401-1562

Dear Jerry:

I think that "Alternative 4" is the most expeditious way to take care of the unexploded ordnance located on the I.N.E.L. site. I think that a great saving could be realized in the cost proposals listed in the D.O.E. predictions. #W2-01 21

First the project should be turned over to the Ordnance Department of the Army. They are experts in the field and are in all reality doing nothing but are being paid. This could be a good training exercise for them. Analysis of compounds could be "bid" by various laboratories at a great saving. Detonation could be done by military "Tanks" and chain whippers that have the capability. I feel this should be done now. One "law suit" circumventing about one accidental death on those grounds would cost more than the affore mentioned proposals; even at the inflated charges stated. #W2-02 06 #W2-03 01 #W2-04 28 #W2-05 35

Further more upon completion of the clean-up all military forces should be compelled to use the I.N.E.L. site for their maneuvers, test and training exercises. That 800 + square miles should have other beneficial uses.

Sincerely,

Clarence Bellem

CB/pr

000149

Lyle

January 13, 1992

Walter H. Sato, Acting Director
Environmental Restoration Division
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, Idaho 83401-1562

Dear Walter:

I agree that alternative 2 is the most appropriate method of alleviating the possibility of ground water pollution. I also feel that this clean up progress should be started as soon as possible. The reason for this rationale is; as long as we are in a short water cycle there will be greater [illegible] on groundwater. It is understood the harder we pump the area north of Rupert the greater the void, this creating a vacuum effect; drawing more from the I.N.E.L. area.

By expediting both the Ordnance and aquifer clean-up now, we would help the failing economy of United States by putting people back to work. I further believe that these projects should begin this year. The longer you postpone clean-ups the greater the liability risk and the more costly they become. The further pollutants traverse the more difficult they will become to recovery successfully.

#W3-01
35

I was very impressed with what is going on at the "Site" in regards to clean-up of Carbon Tetra Chloride, a greater reason for the clean-up to continue as you are doing. As time and research continue the techniques should be brought on line to expedite the process.

Sincerely,

Clarence Callen

CB/pc

000150

WC-00055 (1)

155 Larry #2
Pullman, Washington 99163
1992 January 16th

Mr. Jerry Lyle,
Acting Deputy Assistant Manager
Environmental Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, Idaho 83401-1562

REFERENCES: Proposed Plan for an interim action to reduce the contamination near the injection well and in the surrounding groundwater at the test area north, INEL.

Proposed Plan for a clean-up of unexploded ordnance locations, INEL

SUBJECT: Public comment on above items.

GENERAL:

1) I appreciate the continued inclusion of the glossary of terminology and acronyms used in the publications.

2) Including cost estimates in the proposal material provided is a positive activity and should be continued as matter of practice. Break-downs are appropriate for the publication, although I would like to see a moredetail break-down if available. #W4-01 32

3) I would like to see more consideration given to energy conservation and usage of solar energy technology in the solutions presented.

4) Furthermore, it is my opinion that more on-site destruction be used. Portable equipment should be brought to the site. Alternatively, designs for facilities should be portable for use in other clean-up problems. #W4-02 29

UNEXPLODED ORDNANCE Proposed Plan

1) I would like to see consideration given to use of an electromagnet to pick up magnetic material. It could be attached to a small All Terrain Vehicle which houses the generator.

2) The usage of a metal detector for non magnetic metals would expedite picking up this material. #W4-03 30

3) I would like to see all metals larger than a rifle casing be picked up and recycled as scrap metal. After removal of metals, the areas would be plowed to expose additional material.

4) The incineration or composting of soils is not a high priority item, and the money should be spent on more urgent clean-up areas elsewhere. This is assuming unexploded ordnance has been defused and poses no explosive threat. #W4-04 33

INJECTION WELL Proposed Plan

1) In my opinion, longer term pumping at would be more effective. A 50 gallon per minute pumping rate is 26.8 million gallons/year or about 93 acre feet. Pumping of this volume should be mostly unattended as well as the treatment for cost savings. The treated water could be re-injected outside the polluted zone to further flush the contaminants towards the withdrawal well.

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Continued on other side.

INJECTION WELL Proposed Plan (continued)

2) Sediment material obtained could be further treated at the same facility for treating the warm water waste pond contaminants else where on the site. This might save costs & duplications as compared to a separate facility.

3) The water should not be pumped into the 35 acre disposal pond. It probably needs cleaning up as well. If evaporation is used, a lined pond or container that is impervious to water percolation should be used particularly where access to remove the sediments is feasabile. Filters would not then be needed to recover the sediments for further treatment.

OTHER:

This letter is a submission of written comments as encouraged by your publication.

Sincerely,

Walter E. Bentley

Walter Bentley

Received 4-21-92

000152

Center for Hazardous Waste Remediation Research

University of Idaho

January 22, 1992

TAN and Ordnance Proposed Plans
Jerry Lyle, Acting Deputy Assistant Manager
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, Idaho 83401-1562

Dear Mr. Lyle:

We herein provide comments on "The proposed plan for a cleanup of unexplored ordnance locations at the Idaho National Engineering Laboratory." We believe a fifth alternative should be considered. This is a procedure being studied at the University of Idaho Center for Hazardous Waste Remediation Research. It involves treatment of ordnance-contaminated soils by anaerobic slurry biotreatment. In this process, TNT, RDX, and related compounds are degraded in anaerobic bioreactors or treatment pits to *mineralized* products such as N_2, CO_2, and acetate. The anaerobic biotreatment technology is being developed in collaboration with the U.S. Air Force Office of Scientific Research, the U.S. Environmental Protection Agency (EPA) Emerging Technologies program, and the J.R. Simplot Company of Boise, Idaho.

#W5-01
25

In Alternative 5, contaminated soils would be mixed with water (1:1, weight:volume), carbon (starch wastes from potato processing) would be added at 1-2% (weight/volume), and the soil incubated with minimal agitation under anaerobic (no O_2) conditions in fully lined and covered pits. This process uses water and thus greatly decreases the explosiveness of munitions residues, compared to other alternatives. Degradation of munitions residues would proceed to completion in 60-90 days. This system would be similar to that developed for the herbicide 2-*sec*-butyl-4,6-dinitrophenol, as described in the enclosed preprint. Treated soil would be usable as backfill.

Alternative 5 has the following advantages over Alternative 4, the composting of contaminated soil:

1. Degradation of nitrotoluenes is to *mineralized* products (e.g., CO_2). Composting is an aerobic process whose tendency to produce polymeric materials of uncertain toxicological properties is well known to those trained in the art. These polymeric materials may *not* be *permanent* end-products, and may depolymerize at a future time to yield toxic monomers. Alternative 5 avoids these problems by completely eliminating the nitrotoluene molecules.

2. Alternative 5 provides an opportunity for researchers and businesses from the state of Idaho to participate in cleanup at INEL.

Dr. Ronald L. Crawford
Co-Director
Food Research Center 202
University of Idaho
Moscow, Idaho 83843
(208) 885-6890
FAX: (208) 885-5741

Dr. Leland "Roy" L. Mink
Co-Director
Morrill Hall 106
University of Idaho
Moscow, Idaho 83843
(208) 885-6429
FAX: (208) 885-6431

000153

Alternative 5 has the advantage over all other alternatives of being less costly. Our estimate of costs are as follows:

Record search, 2500 hrs @ $80/hr	$ 200,000	
Safety analysis, 1500 hrs @ $80/hr	120,000	
Design and planning, 375 hrs @ $80/hr	30,000	
Ordnance detonation, 150 hrs @ $2000/ea	300,000	
Materials and supplies (markers, charges)	30,000	
Ordnance searches, 163 acres @ $3500/acre	570,500	
Soil sampling, 450 @ $1000/ea	450,000	
Pit construction and operation, 185 yd^3 @ $110-300/$yd^3$ *	55,500	(using $300/$yd^3$)
Confirmation sampling, 50 @ $500/ea	25,000	
Site reclamation	10,000	
Total	$1,791,500	

* See enclosed preprint

Alternative 5 would, like Alternative 4, require the design and completion of a pilot-scale study prior to implementation. However, this could be accomplished within the framework of the EPA's Emerging Technologies program and the EPA's SITE Demonstration program.

We hope you will consider the new biotreatment alternative outlined above.

Sincerely,

R. L. Crawford

Ronald L. Crawford, Ph.D.
HazWaste Center Co-Director

Don L. Crawford

Don L. Crawford
Professor of Bacteriology

Encl.
/kf

cc. Douglas K. Sell, J. R. Simplot Co.
Wendy Davis-Hoover, EPA

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[redacted]

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contaminants and hazardous metals in soils and waters.

Characterization of hazardous waste sites includes research concerned with the microbial ecology of waste sites, hydrogeology of aquifers and mining areas, effects of wastes on groundwater flow, computer modeling of contamination processes, and use of computerized databases in characterizing hazardous waste sites.

Ongoing Center research attacks hazardous waste problems in several areas:

Agricultural Chemicals
Decontamination of herbicide and pesticide containers and rinsewaters, bioremediation of chemical spills.

Industrial Chemicals
Biotreatment of industrial effluents, design of novel bioreactors using immobilized microorganisms.

Soil
Cleanup of contaminated munitions depots, landfills, and spills using *in situ* techniques.

Groundwater
Transport of pollutant-degrading immobilized bacteria through aquifers, bioremediation of solvent and nitrate pollution.

Mining
Bioleaching and biosorption of metals from mining waste, treatment of acid mine waters.

For more information, contact:

Center for Hazardous Waste Remediation Research

Dr. Ron Crawford
Co-Director
Food Research Center 202
University of Idaho
Moscow, ID 83843
(208) 885-6580
FAX: (208) 885-5741

Dr. Roy Mink
Co-Director
Morrill Hall 106
University of Idaho
Moscow, ID 83843
(208) 885-6429
FAX: (208) 885-6431

University of Idaho

000155

Cover photo: Dinoseb-degrading bacterial consortium. (J.Franklin Bailey of University of Idaho Electron Microscopy Center)

Hazardous Waste Remediation Research

The Center for

Hazardous Waste Remediation Research

At the onset of the industrial revolution only visions of future prosperity existed. Few would have predicted that our "brave new world" would bring with it severe pollution of the environment. Yet, because of historical practices by industry, state and local governments, federal laboratories, and military installations, chemical contamination of soils, surface waters, and groundwaters is a common problem throughout the United States. Cleanup costs are estimated at billions of dollars over the next several decades. The inadequacy and expense of present cleanup methods make basic research on novel remediation technologies a high national priority.

Purpose

The Center for Hazardous Waste Remediation Research, located at the University of Idaho, is a multidisciplinary unit focusing on the development of innovative remediation technologies.

The University of Idaho is uniquely qualified to undertake research in hazardous waste remediation. Not only does it have a core of national-caliber scientists developing remediation technologies, but also experts from the fields of hydrology and mining whose skills lie in physically characterizing waste sites and applying cleanup technologies in the field.

The multidisciplinary Center includes twenty-six faculty and their students from five colleges. Faculty collaborate with selected institutions from outside the university, particularly the Idaho National Engineering Laboratory in Idaho Falls, the Battelle Pacific Northwest Laboratories in Richland, Washington, and the EPA Environmental Research Laboratory in Corvallis, Oregon. Center faculty direct students and postdoctoral scientists in jointly designed research projects, sharing field sites and instruments in a concentrated effort to advance hazardous waste remediation technology.

Organization

The Center is administered jointly by the Institute for Molecular and Agricultural Genetic Engineering and the Idaho Water Resources Research Institute. These administrative units of the UI are dedicated to facilitating interactive research and multidisciplinary programs within the university, state, and region. Under this umbrella, Center faculty and their collaborators from national laboratories and industry focus on developing and field-testing new methods to clean up toxic waste from industry, mining, agriculture, and government installations. Two co-directors and three research coordinators manage the Center, with advice from an advisory panel drawn from academia, federal laboratories, and industry. Collaboration with private companies results in support for graduate students, opportunities for research at their facilities, and funding.

Outreach

A broad educational effort is supported through the Center, whose faculty train undergraduate, M.S., Ph.D., and postdoctoral students in remediation technologies. Other educational components include multidisciplinary seminars, a visiting scientist/lecturer program, short courses for industry and the public, and personnel exchanges with collaborating institutions.

Technology transfer takes place through patenting and licensing agreements coordinated by the Idaho Research Foundation, a private foundation that promotes development and marketing of University of Idaho faculty inventions.

Research

Research programs directed by the Center fall into three areas:

Biological remediation uses microorganisms and microbial products to eliminate or immobilize chemical contaminants. Research includes the use of microbial consortia and pure cultures for *in situ* remediation of contaminants, applications of recombinant DNA technology to bioremediation, deep groundwater microbiology, and bioreactor design.

Geochemical remediation research concerns technology to remove contaminants from water, mining wastes, and soil. Approaches include contaminant extraction, both *in situ* and after processing, and chemical remediation of organic

Preprint — Preprint

Field Scale Anaerobic Bioremediation of Dinoseb Contaminated Soils

D. J. Roberts, R. H. Kaake, S. B. Funk, D. L. Crawford and R. L. Crawford.
University of Idaho, Department of Bacteriology and Biochemistry,
Center for Hazardous Waste Remediation Research

Publication No 91526
the Idaho Agricultural Experiment Station

Table of Abbreviations

PNA	polynuclear aromatic compounds
PCP	pentachlorophenol
TNT	2,4,6-trinitrotoluene
DNOC	2,4-dinitro-o-cresol
2,4-D	2,4-dichlorophenoxyacetic acid
MCPP	(4-chloro-2-methylphenoxy)propionic acid
HPLC	high pressure liquid chromatography
RCRA	Resource Conservation and Recovery Act
HDPE	high density polyethylene

INTRODUCTION

The three general approaches to remediation of soils are physical, chemical and biological methods. Physical treatments include incineration and vitrification. These processes convert the waste to an inert form which still may have to be disposed of as hazardous waste (e.g. incineration ash). Some processes, such as stabilization, decrease the mobility of a contaminant in soil by the addition of stabilizing agents (cement or plastic resins) which bind or envelop the waste into an impermeable matrix, preventing contaminant migration. Other treatment methods such as steam stripping or extraction procedures remove and recover the contaminants from the medium on the basis of their physical properties (volatility or solvent solubility). Biological treatment methods utilize the metabolic diversity of microorganisms to transform toxic, recalcitrant compounds into harmless molecules which may provide energy or metabolic precursors for the microorganisms.

The complexity of the soil environment presents a unique challenge to the bioremediation industry. Although biodegradation is a natural process and a necessary part of nutrient cycling in the soil environment, many of the compounds added to soil by man are toxic and recalcitrant under the conditions present in the environment. The growing list of publications presenting laboratory results indicating successful biodegradation of many anthropogenic, recalcitrant compounds has prompted a new faith in bioremediation as a useful technology for the treatment of contaminated soils.

Many laboratory studies have relied on the disappearance of a compound as a measure of biodegradation. This can be misleading since in some instances disappearance of a specific molecule may occur concomitantly with its transformation to a more toxic compound. An example is the conversion of the relatively non-toxic herbicide 2,4-dichlorophenoxyacetic acid (2,4-D), to the mutagenic compound 2,4-dichlorophenol by a genetically engineered soil organism (43). The production of 2,4-dichlorophenol from 2,4-

D could have been responsible for the toxic effects on the natural population of the soil seen after the addition of this organism to 2,4-D-contaminated soils (14). This example demonstrates the need to understand the differences in results obtained from laboratory studies and from environmental applications of bioremediation. Sims *et al.* (44) presented a discussion of approaches to bioremediation of contaminated soils, pointing out the need for thorough site characterization, treatability studies, and possibly the integration of physical, chemical, and biological remediation methods into a treatment train to achieve complete cleanup of a contaminated site.

CURRENT SOIL BIOREMEDIATION PRACTICES

The focus of research into bioremediation of contaminated soils must encompass not only the nature of the compound and its transformation intermediates, but also the environment in which it is present. Physical parameters such as temperature, pH, and redox potential as well as the presence of other contaminants and the binding affinities the contaminating compounds may have for the soil affect the removal of target chemicals from contaminated soils. Another very important factor in the implementation of soil treatment technologies is the nutrient status of the soil. Many soils are nutrient-limited, and nutrients such as oxygen, nitrogen, and phosphate must be supplied to ensure that the microorganisms are in an active metabolic state. Biostimulation, the process of nutrient addition to contaminated environments to stimulate biological destruction of contaminants has been used successfully for some time for the remediation of oil-spill contamination in soils (1, 3).

Another important soil characteristic to be considered when planning a remediation program is the biological competency of the soil. Many soils will contain the appropriate microbial population to degrade the contaminants present in that soil, especially if the soil has low concentrations of contaminants that have been present for extended periods of time. Often the native flora can be stimulated to degrade a contaminant by nutrient

addition alone. Some soils, however, may be incompetent because of the toxicity of the contaminant to the microorganisms required to carry out the metabolism of the compound, or other environmental factors.

To improve the biological competency of a particular soil, microbial inoculants are often added. Microbial inoculants are most successful if they are organisms obtained from the environment in which they will be applied. Bioenhancement of contaminant degradation using laboratory strains of pure cultures and/or genetically engineered organisms under environmental conditions has been reported but has not seen the success expected, probably due to competition for nutrients from the natural microflora (40). The addition of manure and sewage sludge to contaminated soils has been used successfully to improve their degradative capabilities (15, 35).

Many soil contaminants are amenable to remediation by aerobic methods. These methods, described below, are the most widely used and understood of the soil treatment methods. Each method can be improved by biostimulation and bioenhancement procedures as described above. Table 1 summarizes the advantages and disadvantages of current soil bioremediation technologies.

Land Farming

Land farming is an aerobic treatment method that is applicable to many types of contaminated soils. In this method the contaminated soil is treated in above-grade treatment beds. The treatment beds are usually pits lined with a high-density polyurethane liner that is then covered with clean sand to allow drainage. Perforated pipes collect the drainage, which can be treated separately or recycled. The contaminated soil is then spread over the sandy layer. In the United States, regulations require that such pits contain a layer of sand and a leachate collection system under the polyurethane liner in order to recover any leaked material if the liner is breached.

The land farming process can be optimized by the dilution of contaminated soil with clean soil to reduce initial toxicity, as well as by controlling physical parameters such as aeration, pH, soil moisture content, and temperature. Aeration is often accomplished by tilling the soil or, in more mechanized systems, by forced aeration. When forced aeration is used, the plots should be covered and the exiting air cleaned through filters. To achieve temperature control, hot air, or the "greenhouse effect," can be employed in a closed system. Land farming has been widely implemented at petroleum refinery sites and at sites contaminated with polynuclear aromatic residues (PNA), or pentachlorophenol (PCP) (e.g., sites connected with the wood-preserving industry).

Composting

Composting is an aerobic bioremediation technology similar to land farming. In this technique, the contaminated soil is mixed with wood chips, straw, or some other bulking agent to provide porosity for air flow. Composting can be carried out in a bioreactor with a forced air supply to provide aeration, or in open piles (windrows) that are periodically reformed to facilitate oxygen contact. The addition of bulking materials is also used to enhance microbial activity by supplying a readily utilizable carbon source. The aerobic metabolism of large amounts of carbon creates heat, so composting treatments often run at high temperatures. Fast degradation rates can be obtained, even though oxygen contact tends to be poor.

With composting as with any biological treatment method, environmental parameters such as moisture content and pH need to be monitored and adjusted. The nitrogen content of a compost pile requires particular attention due to the high carbon contents of the bulking agents. Manure is often added to composting operations as a source of nitrogen, as well as a source of organisms. Composting operations are usually run as batch operations, reusing a portion of an old compost pile as the inoculum for new ones.

Experimental composting operations have been performed on soils contaminated with explosive nitroaromatic compounds such as 2,4,6-trinitrotoluene (TNT) (17, 23, 27, 60).

Slurry Reactors

Contaminated wastewaters have been treated in bioreactor systems, such as municipal sewage treatment plants, for years. The application of bioreactors such as solid-state fermentation and gas-liquid fermenters to multiphase systems is a growing industry and is receiving much attention by engineers. Bruner (10, 11) described several such bioreactor systems. Innovative research is now showing that soils can also be treated in specialized bioreactors termed slurry reactors. In this process, a contaminated soil is mixed with at least 30% aqueous medium in a reactor vessel. The reactor is usually equipped with a mixing system to ensure maximum contact between the microbial population, the target molecules and nutrients and to prevent feedback inhibition. The reactor operator can also control pH, temperature, oxygen contact, and moisture content. Slurry reactors can be run either aerobically or anaerobically.

The implementation of slurry reactors to treat contaminated soils offers the opportunity to shorten treatment times for contaminated soils from 6-5 months to one or two weeks or months. The better process control and availability of contaminants to the microorganisms provided by mixed slurry systems are advantages over other biotreatment systems. This technology may prove the most advantageous for the remediation of soils contaminated with highly recalcitrant compounds and for soils that are difficult to treat by other techniques.

In Situ Treatment

All of the above bioremediation technologies require excavation of the soil from the contaminated site. Excavation of contaminated soil is a very expensive operation requiring specially certified personnel and in some cases specialized equipment. *In situ*

bioremediation, or bioreclamation, is a technology that does not require the excavation of large amounts of soil. This method involves the injection of nutrients and an oxygen supply in an aqueous medium directly into the contaminated environment (1, 13, 33, 39). The aqueous treatment medium flows through the contaminated soil and is then retrieved by extraction wells downgradient from the injection well and oxygenated again before recirculation into the contaminated site. More aggressive methods for *in situ* treatment allow the combination of steam stripping, groundwater treatment, and biological remediation. Hydrogen peroxide is often used to provide oxygen in cases where soil permeability to oxygen is limiting (5, 22). An anaerobic *in situ* treatment has also been performed (42). In this case, acetate was added as a supplemental carbon source to stimulate nitrate- and sulfate-reducing organisms to degrade halogenated aliphatic compounds.

The *in situ* process is usually applied when excavation of the soil would be difficult, such as when contamination is very deep, or when vast amounts of contaminated soil are involved making excavation unfeasible. The *in situ* processes require an extensive understanding of the hydrogeology of the sites to be treated. *In situ* processes may be precluded when irregular geology prevents the transport of oxygen and nutrients through the contaminated area. Careful monitoring of groundwater is required to protect aquifers. Reaction rates are usually slow for *in situ* processes due to nutrient, oxygen and sometimes temperature limitations. Determinations of the efficiency of *in situ* treatment methods are often difficult because of problems in obtaining truly representative soil samples. The occurrence of pockets of untreated soil is difficult to monitor or avoid.

DEGRADATION OF NITROAROMATIC COMPOUNDS

Nitroaromatic compounds are important in the chemical industry and are used to manufacture thousands of consumer products (29). These products are represented by at least four classes of chemicals. The largest and most well known of these classes is the

polyurethanes, which are manufactured from 2,4- and 2,6-dinitrotoluene. The second largest class of nitroaromatic compounds is the hazardous energetic nitroaromatic compounds such as TNT. Nitroaromatic compounds are also used in large quantities as pesticides and herbicides by the agricultural industry, and as pharmaceuticals.

The current technologies used to treat soils contaminated with nitroaromatic compounds, such as the herbicide 2-sec-butyl-4,6-dinitrophenol (dinoseb) entail physical methods such as incineration or the haul-and-store method. These methods are costly and are not environmentally sound. Inefficient incineration can produce hazardous emissions and carbon dioxide. The latter compound is a greenhouse gas, and its buildup in the atmosphere is thought to be harmful to the environment. The haul-and-store method merely stockpiles hazardous waste in one area. Under current regulations, long-term liability for the hazardous wastes remains with the generator of the waste, even after disposal.

Investigations are under way to develop biological methods to remediate soils contaminated with nitroaromatic compounds, but none have been scaled-up to a commercial level. In order to evaluate a bioremediation scheme for contaminated soils, the effects of the contaminants on soil microorganisms and the effects of the soil microorganisms on the contaminants must be identified. Although many sites in the U.S. Pacific Northwest have been contaminated with nitroaromatic pesticides and herbicides through spillage and crop-dusting operations, there have been relatively few investigations into the biodegradation of these compounds.

Laboratory studies done with soil enrichments have shown that dinoseb is biodegradable. Doyle *et al.* (15) reported $^{14}CO_2$ evolution from ^{14}C-dinoseb added to soil, whether the soil was amended with sewage sludge, dairy manure or left unamended. Stevens *et al.* (52) tested the abilities of the natural microbiota of several Idaho soils to degrade dinoseb. The results indicated that some soils had the ability to transform dinoseb, but that the presence of nitrate and high levels of dinoseb were inhibitory to

dinoseb degradation in most soils. Radiotracer studies were not performed, so mineralization of the dinoseb could not be inferred. The metabolic pathways for dinoseb metabolism were not determined in either of these studies.

The three different types of substituents on the dinoseb molecule (nitro, hydroxyl and sec-butyl) present sites for multiple attack on the molecule. The metabolism of this compound in soil could possibly involve a network of intermediates, rather than a single pathway, making the determination of a complete biodegradation sequence difficult. Studies on the metabolism of dinoseb and an analogous herbicide 2,4-dinitro-*o*-cresol (DNOC) have revealed that the initial attack on the molecules by bacteria is probably at the nitro groups.

Early studies concerning the degradation of dinoseb and DNOC showed that a *Pseudomonas* sp. could initiate an alteration of DNOC to 6-amino-2-methyl-4-nitrophenol and 3-methyl-5-nitrocatechol (54). Other researchers have enriched for and isolated from various soils several strains of slow-growing aerobic *Arthrobacter*-like organisms and two strains of *Pseudomonas* able to metabolize DNOC. These organisms decolorized DNOC and produced nitrite. No other metabolic intermediates were reported. Although 4-nitrophenol and 2,4-dinitrophenol were attacked by these bacteria, dinoseb and other nitroaromatic compounds were not (24). Wallnoefer *et al.* (56) found that the nitro group in the *ortho* position of DNOC or dinoseb was converted to an acetamido group by an *Azotobacter* sp.

In a recent study, Stevens *et al.* used a chemostat to enrich for and isolate organisms capable of degrading dinoseb from dinoseb-contaminated soil. These organisms were able to transform dinoseb to reduced products under microaerophilic and denitrifying conditions, but were unable to completely mineralize the molecule. The reduced products polymerized, forming a multimeric precipitate. The chemostat enrichment procedure also produced an anaerobic consortium that could completely degrade dinoseb to acetate and

CO_2 (53). The actual pathway of dinoseb degradation under anaerobic conditions has yet to elucidated.

A large portion of the literature concerning the degradation of nitroaromatic compounds has dealt with the explosive nitroaromatic compounds and has been reviewed recently (26). Most of the results have shown that under aerobic or anaerobic conditions, the first step in the degradation of nitroaromatic compounds is the reduction of the nitro groups to hydroxylamino, then to amino substituents, in both mammalian and prokaryotic systems. Under aerobic conditions, the hydroxylamino moieties can polymerize, forming azo linkages which are more recalcitrant and possibly more toxic than the original parent compound.

Under anaerobic conditions, the amino compounds are formed and are stable (37). Hallas (18) examined the anaerobic degradation of several nitroaromatic compounds and found reduction of the nitro group to be the major mechanism of compound alteration. Toxicity studies on TNT, 2,6-dinitrotoluene and 2,4-dinitrotoluene have indicated that the amino or hydroxylamino transformation products are primarily responsible for their toxicity (21, 28, 59).

Investigations into the aerobic degradation of mononitrophenolic compounds have indicated that the ring system can be oxidized by mono- and dioxygenases, producing nitrite and catechols that can then undergo oxidative ring cleavage (46, 47). Recent publications have indicated that the dinitrotoluenes and possibly TNT can be mineralized aerobically by a pseudomonad (48) or by the white rot fungus *Phanerochaete chrysosporium* (17). This type of work is still in its infancy, but it may lead to promising new treatment methods for wastes contaminated with nitroaromatic compounds.

BENCH-SCALE STUDIES OF THE BIOREMEDIATION OF DINOSEB-CONTAMINATED SOILS

The bioremediation scheme developed in our lab arose from the observation of Stevens *et al.* (53) that anaerobic cultures were capable of metabolizing dinoseb to acetate and CO_2. The majority of the literature indicated that the initial pathway for the degradation of nitroaromatic compounds was reductive. Anaerobic conditions which would favor reductive processes could be highly favorable for the complete degradation of nitroaromatic compounds. Anaerobic conditions would also allow reductions to amino compounds to proceed at a rapid rate so that polymerization of hydroxylamino intermediates would not occur.

The first step in the implementation of the remediation plan was to make the soil anaerobic. It has long been known that saturated soil environments eventually become anaerobic as the available oxygen is utilized by heterotrophic microorganisms (8). The rate of this process depends on the amount of carbon available to the heterotrophs and on their metabolic state. Once a soil has been rendered anaerobic by heterotrophs utilizing dissolved oxygen as a terminal electron acceptor for the metabolism of the carbon source supplied, low redox potentials can be maintained quite readily by maintaining saturated conditions. The diffusion of O_2 is about 10^{-5} slower through water than through air. Gaseous diffusion essentially ceases when the fraction of the air-filled pore space in soil is below 0.12 (58), therefor in saturated environments very little oxygen enters either the soil or aqueous phase.

We have used several inexpensive carbon sources to establish anaerobic conditions in soil. We tested soluble carbon sources such as glucose as well as insoluble carbon sources such as starch as cosubstrates or as a supplemental energy sources for dinoseb-degrading consortia (51). The application of insoluble starch was found to support rapid oxygen depletion in uncontaminated soils flooded with either water or phosphate buffer. This carbon source also supported long-term maintenance of redox potentials well below -

300 mV, which is the redox value below which even the strictest anaerobes (the methanogens) can grow. Waste products of the Idaho potato-processing industry served as a readily available and inexpensive source of insoluble starch. This material has been described elsewhere (25) and will be referred to as "starch" for simplicity.

The procedure developed was to flood the soil with phosphate buffer and to add a carbon source to the soil buffer slurry. The application of this procedure to the bioremediation of dinoseb-contaminated soils was tested in several bench-scale experiments using soils from two different sites (25). These soils differed in their exposure history and in the concentrations of dinoseb and other contaminants present. Both soils were from rural airstrips that had been used for crop-dusting operations. A sandy loam soil from an airstrip in Ellensburg, Washington, was contaminated with dinoseb as well as other herbicides and fertilizers as a result of washing crop-dusting equipment over several decades. This soil was an excellent prototype of chronic low-level contamination over an extended period and represents a large portion of the actual examples of contamination found in the northwestern United States.

A silt loam soil from an airstrip near Hagerman, Idaho, was also obtained. Contamination at this site resulted from the leakage of dinoseb storage barrels. This soil was an example of soil that has received acute high level contamination over a short time period.

Table 2 compares the inorganic constituents of the two soils. The inorganic constituents observed in the two soils indicated that the soils contained ample inorganic nutrients to support microbial metabolic activity. The presence of nitrate, which has been seen to inhibit dinoseb degradation (52), in both soils had to be taken into consideration when a bioremediation procedure was designed. The presence of sulfate could also affect the degradation of dinoseb in the acutely-contaminated soil. Sulfate might be used as an electron acceptor by sulfate-reducing bacteria, which could compete for the starch or fermentation products of the starch. Both soils had obviously been contaminated with

fertilizing compounds as well as the organic compounds. This is not unexpected, due to the use of these airstrips for agricultural purposes. The co-contamination of pesticide- or herbicide-contaminated soils with fertilizers will probably occur at most dinoseb-contaminated sites.

Bench-scale experiments have revealed that the remediation of dinoseb from contaminated soils was possible in static flask cultures containing 2% starch in 50% soil/buffer mixtures that were stirred only occasionally. These experiments were performed using up to 300 g of contaminated soil. The experiments to determine the biodegradability of the contaminants in the chronically contaminated soil revealed that it was microbiologically competent. Flooding of the soil with an equal volume of 50 mM phosphate buffer at pH 7 and addition of 2% (w/w) of the starch provided the soil with the nutrients necessary to create an anaerobic environment in which dinoseb and most of the other contaminants present could be degraded. Analyses showed that nitrate removal began almost immediately and was complete within 4-7 days. Dinoseb degradation began after a 2-3 day lag period and was usually complete within 10-20 days (25). The redox potential decreased to below -200 mV within 4-5 days. The inoculation of the soil remediation tests with laboratory enrichment cultures did not produce results significantly different from those produced by uninoculated cultures.

Table 3 summarizes the results of the analyses of pooled, treated soils from the replicates of one such bench-scale remediation experiment. Of the five initial contaminants only, 2,4-D appeared to be somewhat recalcitrant to anaerobic remediation. The final concentration of dinoseb detected in the soil (74 ug/kg) was well below our target remediation limit of 2.5 mg/kg.

Bench-scale experiments with the acutely contaminated soil revealed that the biological competency of this soil was improved by the addition of a 5% (v/w) laboratory enrichment culture, or by the addition of 10% or 50% (w/w) of dried pasviously treated soil (25). The dried treated soil was soil from the chronically dinoseb contaminated site

that had been treated as described above, and then dried and stored at 4°C for use as inoculum. The addition of 10% treated soil appeared to be the most efficient inoculum (25).

PILOT-SCALE STUDIES OF THE BIOREMEDIATION OF DINOSEB-CONTAMINATED SOILS

Bench scale experiments do not always imply the technology will be successfully scaled up. Therefore, we felt it was important to demonstrate the remediation of dinoseb from contaminated soils in larger-scale experiments. An initial demonstration of the technology was conducted on-site with 45-50 kg of the chronically contaminated soil in a stirred reactor or in static reactors (plastic tubs).

The soils were excavated by shovel and sieved through a 6.35 mm screen on site. Personnel wore dust filters and protective clothing. The soils were then weighed into the reactor vessels, which contained the appropriate amount of phosphate buffer. The starch supply was then added, and the tanks were mixed thoroughly. The reactor and tubs were incubated in a small travel trailer that had been renovated for this purpose. The static tanks (in triplicate) received 45 kg of chronically contaminated soil, 45 liters of pH 7, 50 mM phosphate buffer, and 0.9 kg of starch. Control cultures contained either uncontaminated soil, starch and buffer, or contaminated soil and buffer without starch. The demonstration was performed twice at this scale. Temperature, pH, and redox potential were monitored every 15 min (first demonstration) or 2 h (second demonstration) through use of remote probes and an A/D data-logging unit controlled by a personal computer. Aqueous and soil samples were taken periodically and assayed for concentrations of dinoseb, volatile organic acids, nitrate, ammonium, hydrolizable starch, and total soluble reducing sugars.

The results of the second demonstration are presented in Figures 1, 2, and 3. The dinoseb concentration in the aqueous phase was measured directly by HPLC; the dinoseb

concentration in the soil was measured by HPLC analyses of acetonitrile soil extracts. Both methods are described elsewhere (25). The results presented in Figure 1 demonstrate that dinoseb degradation rates are rapid under this treatment protocol, and that the mixed tank allowed dinoseb removal from the soil to proceed more rapidly than in the static tanks. The redox potential in the static tanks dropped faster than in the stirred tank (Figure 2). No polymerization products were observed in either the static tanks or the stirred tank. This suggests the initial drop in redox potential was sufficient to prevent polymerization reactions from occurring.

Figure 3 presents the accumulation and removal of dinoseb and the three most prominent biotransformation intermediates in the soil of the stirred tank. The intermediates were not identified, so concentrations could not be determined. These results demonstrate the necessity of analyzing intermediate compounds. If the concentration of dinoseb was used as the only parameter to establish whether the treatment was finished, the treatment might have been stopped prematurely, after only 9-10 days. Although very little is known about the intermediates, we suspect that the intermediate identified as 1 in Figure 3 still may retain some toxic properties. The ultimate removal of this intermediate seemed to bring about a reduction in toxicity of the soil. When this intermediate was removed, sulfate-reducing organisms present in the soil began to metabolize the fermentation products of the starch degradation, producing a black iron sulfide precipitate visible in the soil, and fungi began to grow on the surface of the reactors. We are currently developing methods to test the toxicity of the soil at various times during the treatment to determine at which time the toxicity is eliminated. This work will help to prove the environmental safety of the technology and provide valuable information about the toxicity of the transformation intermediates. The intermediates will also be identified.

A larger-scale demonstration of this technology was performed using the acutely contaminated soil from the airstrip site near Hagerman, Idaho. The demonstration was carried out in a lined pit on-site. All personnel wore Tyvek suits, full-face respirators,

gloves, and protective footwear during all procedures done in the pit. The demonstration consisted of three stages. Stage 1 and 2 were performed in 2,600 liter fiberglass static reactors.

Stage 1 consisted of three of these reactors, which were loaded with approximately 350 liters of irrigation water, 2,268 g of K_2HPO_4, and 686 g of KH_2PO_4. Ingredients were mixed until the salts dissolved. Approximately 315 kg of contaminated soil was then added to each reactor by means of a backhoe; 6.3 kg of starch was then added, as well as 35 kg of dried, treated soil obtained from the treatment of the chronically contaminated soil. The pH of the contents of each reactor was adjusted to 7 with saturated sodium hydroxide or concentrated phosphoric acid as required, and pH, temperature, and redox electrodes were installed in each reactor. The data was collected and stored in an A/D data-logging unit connected to a 12-V deep-cycle battery. The reactors were covered with 6-mil visqueen, which was secured under the lip of each tank with an elastic cord.

The contents of the reactors were sampled in replicate at time 0 and then every 2 or three days thereafter. Reactors were mixed once after 15 days incubation. There was no obvious evaporative loss of the aqueous phases during the incubations. Stage 1 was carried out during the month of August. The temperature in the tanks cycled daily between 25° and 32° C; the average temperature was 28° C. The pH of the aqueous phase remained within 0.2 pH units of 7. The redox potential in the aqueous phase of the reactors dropped rapidly and was below 0 mV by day 2. The dinoseb was removed from the aqueous and soil phases by 15 days (Figure 4). The treatments were incubated a total of 45 days to allow the concentration of intermediate 1 (which corresponds to intermediate 1 in Figure 3) to decrease (Figure 4).

Stage 2 consisted of 5 reactors set up the same as in stage 1, except that the soil contents from stage 1 were split evenly between the 5 reactors as inocula. The contents of the reactors were allowed to incubate 13 days. This stage was designed to generate inocula for the third stage, so samples were taken only initially and after 13 days. The dinoseb was

removed from the soil and aqueous phases by the end of the incubation, but intermediate 1 was still present.

The contents of the five, stage 2 reactors were used as inocula for the stage 3 static reactors. These reactors were capable of holding 6,000 liters and were loaded with approximately 2,000 liters of irrigation water, 12.4 kg of K_2HPO_4, 3.7 kg of KH_2PO_4, and approximately 2,000 kg of contaminated soil. Temperature, redox potential, and pH were monitored as described for stage 1. Soil and aqueous phase samples were taken at time 0 and then once a week. The incubation was carried out throughout the months of October and November.

Average temperatures of the aqueous phase were in the mid-twenties initially, but as the climate reflected the change of season, the temperatures in the reactors underwent large fluctuations. The pH was maintained within 0.2 pH units of 7, and the redox dropped to below 0 mV within 2-3 days. The results of HPLC analyses of these samples are summarized in Figure 5. This figure demonstrates again the importance of monitoring the intermediates of the degradation of a compound rather than only the compound itself. The overall incubation time for dinoseb removal from the soil/buffer mixture at this scale was not significantly different from the incubation times observed in smaller-scale experiments, suggesting that even larger-scale treatments will occur in similar time frames. This is encouraging, since these were static tanks. Stirred tanks would presumably require even less time for the bioremediation process to occur, as indicated by our experiments with the chronically contaminated soil near Ellensburg, Washington.

COMMERCIALIZATION

The technology described above is presently in the patent review process and will be commercialized in the near future. The commercial methods applied will be site-specific, but we have proposed three application procedures for this technology.

The process will lend itself well to large anaerobic slurry reactors that can be placed on a truck bed and hauled from site to site to carry out soil remediation at sites such as rural airstrips. These sites usually contain relatively small amounts of soil (50-500 cubic meters) that have low levels of multiple contaminants. The reactor design can be relatively simple, since only pH and temperature must be controlled. The removal and control of oxygen concentration and redox potential are inherent to the system, as long as sufficient amounts of supplemental carbon are supplied. The mixing of the soil ensures more rapid desorption of the compounds from the soil and short treatment times. Other biodegradable contaminants that are not removed by the anaerobic process may be removed by operating the reactor aerobically following the anaerobic stage.

A second application of the technology would be an innovative variation of land farming that we have termed "anaerobic land farming." This method would use a lined pit similar to that used in land farming, but drainage of the pit would not be necessary. The pit liner would serve not only to isolate the treatment system from uncontaminated areas, but would keep the aqueous phase in the treatment area, allowing soil saturation. Mixing the contaminated soil with the carbon source, soil inoculum, and buffer by putting it through a hopper before putting it in the pit would be necessary to ensure complete wetting of the soil. Periodic gentle mixing of the contents of the anaerobic pit would be beneficial, ensuring rapid rates of compound solubilization and degradation and preventing the formation of pockets of untreated soil. This type of application would be most suitable to large sites that contain enough soil to justify the expense of digging and lining a pit at each site more favorable than the expense, both in time and money, of running several batches of soil through a slurry reactor.

The process could also be run as an *in situ* procedure by using conventional methods to deliver the supplemental carbon source and other nutrients, but omitting the oxygenation process. If the nutrient transport system were run as a closed loop, inadvertent oxygenation would be avoided. The effects of rendering large tracts of soil carbon-rich and

anaerobic must be thoroughly investigated before this type of remediation can be performed.

COST COMPARISONS

Economic considerations play a major role in the selection of a soil remediation process. We have estimated the costs of various soil remediation technologies on the basis of personal communications from remediation specialists or from the literature. Figure 6 presents a comparison of total estimated costs for different treatment methods. The components of the cost of each treatment are explained below.

Incineration

Incineration is often employed when immediate clean-up of hazardous wastes is necessary. The costs associated with incineration become very high, especially when long distance-hauling is necessary.

A facility in Texas charges $600/ton to incinerate dinoseb-contaminated soil. Added to this is the cost of excavation and transportation of the soil to and from the incinerator. The average cost of excavation and transportation of soil is $100-150/ton. The adjusted total cost for incineration would then be $700-850/ton.

Storage

Dinoseb-contaminated soil has also been hauled to landfill sites that will permanently store the soil. These facilities only store contaminated soils and do not actually eliminate the waste. New federal guidelines will not allow the dumping of dinoseb contaminated soil above 2.5 ppm after May 8, 1992.

Envirosafe, a RCRA certified hazardous waste storage facility in southern Idaho, charges $120/ton to store contaminated soil. This again excludes the cost of excavation

and transportation of the soil, which would bring the total cost to $220-270/ton for site owners in our region.

Anaerobic Land Farming

We have obtained from the Environmental Services Division of the Morrison Knudsen Company of Boise, Idaho the design for a pit to treat large quantities of contaminated soil. The majority of the expense for the anaerobic land farming pit is incurred for the construction of the pit liner. A liner to meet or exceed government specifications would be approximately 6 feet thick and would be composed of several materials. First, a 2 foot layer of clay would be laid down, then a layer of high-density polyethylene (HDPE). This layer represents the secondary containment portion of the liner. The primary section would consist of 12 inches of granular material, a geotextile sheet, another 2 feet of clay, a layer of HDPE, and finally 12 inches of granular material to protect the polyethylene. Also, a floating plastic sheet or foam would be used to prevent evaporation.

Such a pit can accommodate from 600-10,000 tons of soil. Upon completion of the degradation process, the soil would be backfilled to its original location, and the synthetic portion of the liner would be removed and disposed of. A single pit could be used to repeatedly remediate several batches of soil.

On a scale accommodating 5,000 tons of soil, the average cost is $40/ton for a 335 square meter pit. The approximate cost to excavate the soil and monitor the pit would be $55-78/ton. This brings the total of soil remediation to $95-118/ton (costs calculated from data supplied by Morrison Knudsen).

Composting

Although composting is an aerobic process, we are presenting its costs for comparison to other technologies. The cost range for composting can vary greatly depending on the materials being composted and the size of the operation.

In 1978, the U. S. Army proposed a composting operation that would treat three tons of TNT-contaminated soil per day at an average cost of $287/ton (38). The initial construction cost was estimated at $376,750 to cover the construction of a permanent large-scale facility that would be used to treat contaminated soil that is continually produced.

Modern facilities for composting have become more efficient and less expensive due to the incorporation of bioreactors. For example, sewage sludge can be composted in a bioreactor for $150/ton. For hazardous waste, an additional $50-100/ton is added to supplement the cost of sampling and monitoring equipment, increased safety standards, and transportation of the contaminated soil. Composting of contaminated soils should therefore cost from $200-250/ton.

Mobile Treatment Facility

As described above, we have proposed the construction of a mobile soil-slurry reactor that would be used for on-site treatment of contaminated soils. Although no prototype has been constructed, the cost for a truck and trailer, with a bioreactor premounted on the trailer, has been calculated to be about $228,000. This bioreactor mimics the design of a 12-cubic meter, cement mixer that can be sealed and equipped with components for sampling and rotating the soil/buffer mixture. The average cost of operating this unit would be $90/ton, which includes loading and operation of the bioreactor.

In Situ Treatment

To avoid the cost of soil excavation and meeting some of the more complex regulations pertaining to the disposal of hazardous waste-contaminated soil, *in situ* remediation has been investigated. Several monitoring wells would have to be drilled throughout the contaminated area, and an extraction well used to recirculate an aqueous solution through the soil to keep it saturated and prevent groundwater contamination. Monitoring wells would be drilled periodically throughout the process to obtain random samples of soil in and around a site.

The cost range for this method of treatment varies greatly depending on the number and depth of wells, knowledge of the hydrogeology at the site, and extent of contamination. We have found estimated costs for the treatment of two hydrocarbon-contaminated sites by this method. The first reported a cost of $130/cubic meter (12) to treat a gasoline-contaminated site in which 4,600 cubic meters of soil were contaminated. A second report was found for a site in which 4,600 cubic meters of soil were contaminated with hydrocarbon solvents. The estimated cost of this treatment was $59/cubic meter(41). These costs represent approximately $118/ton and $54/ton, respectively.

SUMMARY

We have demonstrated a soil bioremediation technology for the remediation of the recalcitrant nitroaromatic herbicide dinoseb from large quantities of soil. This technology is simple and inexpensive compared to current physical methods employed for soil remediation. The commercialization of this process could make use of either a slurry reactor design, or an anaerobic landfarming pit design, depending on the site characteristics.

The technology consists of stimulating the natural organisms present in the soil by flooding the soil with a pH 7 buffer and adding a rich carbon source to provide an energy source for heterotrophic organisms. The metabolic activity of the heterotrophic organisms

removes oxygen and nitrate from the soil slurry (Both may inhibit dinoseb degradation.), lowering the redox potential and allowing dinoseb degradation to occur.

We have found that at least one soil contaminated with chronic levels of dinoseb over long periods of time contained the appropriate organisms to facilitate the treatment procedure, needing only biostimulation with nutrients and carbon. The long exposure period and low contamination levels apparently provided the conditions necessary to allow the proliferation of an indigenous population of dinoseb-resistant heterotrophic organisms and anaerobic fermentative organisms capable of dinoseb metabolism. Other contaminants present in this soil were not inhibitory to the dinoseb degradation process and were largely removed from the soil during the anaerobic treatment.

In another soil that had been acutely contaminated with high levels of dinoseb, the appropriate organisms were either not present, or were inhibited by the high levels of dinoseb. The augmentation of this soil with previously treated soil from the chronically contaminated site provided the necessary organisms for the bioremediation to occur.

The remediation of contaminants other than dinoseb from multiply contaminated soils suggests that the anaerobic treatment procedure is very versatile. Investigations into the remediation of soils contaminated with other aerobically recalcitrant compounds may reveal additional applications of this technology.

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Table 1

Comparison of Biological Remediation Technologies

Technology	Advantages	Disadvantages	Application/contaminant	References
Land farming	• simple procedure • inexpensive • currently accepted method	• slow degradation rates • residual contamination often not removed • high exposure risks • may require long incubation periods	• surface contamination • aerobic process • low to medium contamination levels • pentachlorophenol • oil and gasoline • PAH	9,15,19 40,44,55
Composting	• more rapid reaction rates • inexpensive • self heating	• needs bulking agents • requires aeration • nitrogen addition often necessary • high exposure risks • residual contamination • incubation periods are months to years	• surface contamination • aerobic process • can treat high contamination levels • nitroaromatic explosives • aerobic sewage sludges • oil and gasoline	9,23,27 34,38,49 50,55,60
In situ	• relatively inexpensive • low exposure risks • excavation not required	• low degradation rates • less control over environmental parameters • need good hydrogeological site characterization • incubation periods are months to years	• deep contamination • aerobic or nitrate reducing conditions • low to medium contamination levels • oil and gasoline • chlorinated aromatics • chlorinated hydrocarbons	1-6, 12,13,22 30,32,33 39-42 45,55
Slurry Bioreactors	• good control over parameters • good microbe/compound contact • enhances desorption of compound from soil • fast degradation rates • incubation periods are days to weeks	• high capital outlay • limited by reactor size • high exposure risks	• surface contamination • recalcitrant compounds • soils that bind compounds tightly • aerobic or anaerobic process	7,10,11 16,29,31 36,54,56 60

000187

Table 2
Inorganic Parameters of Test Soils

Inorganic Parameter	Chronically Contaminated Soil	Acutely Contaminated soil
Nitrate (ppm)	134	294
Ammonium (ppm)	144	217
Sulfate (ppm)	not detected	84
pH	7.58	7.52
P (ppm)	58	45.1
K (ppm)	480	288

Reprinted with permission from Kaake et al. (1992).

000188

Table 3
Herbicide Remediation from Contaminated Soil

Compound Identification *	Initial Soil Mean **	Final Aqueous	Final Soil Mean **	Soil % removal
Dinoseb	160,000	1.02	74	99.95
MCPP	1,210	17***	440 ***	63.64
Ioxynil	888	0.17***	10 ***	98.87
2,4-D	153	0.35***	94	38.70
Dicamba	106	2.60	24	77.04

* Herbicide and pesticide analyses were performed by Manchester Laboratories, Manchester, Washington. EPA methods 8150 and 8080 were used. The compounds listed above were the only ones detected.

** Units are ug/kg; results are the average of analyses of three samples.

*** Compounds were not detected; values represent 1/2 of the detection limit for the compound.

Reprinted with permission from Kaake et al. (1992).

000189

Figure 1. Dinoseb removal from soil and aqueous phases of 50 kg treatments of the chronically contaminated soil. Reactors received 45–50 kg of contaminated soil, 1 kg of starch, and 45–50 L of 50 mM of phosphate buffer pH 7

- o Stirred reactor aqueous
- • Stirred reactor soil
- ▽ Static reactor aqueous
- ▼ Static reactor soil

Figure 2. Redox potential in 50 kg treatments of the chronically contaminated soil. Reactors are those of Figure 1.

- o Stirred reactor
- ▽ Static reactor

Figure 3. Dinoseb removal and intermediate accumulation and removal in the stirred reactor soil extractions. Unidentified intermediates were quantified using peak area. DNOC was used as an internal standard to assure extraction efficiency and detector performance.

Figure 4. Dinoseb removal and intermediate accumulation and removal in 315 kg treatments of acutely contaminated soil. Reactors received 350 L of 50 mM phosphate buffer pH 7, 6.3 kg of starch and 35 kg of treated soil as inoculum.

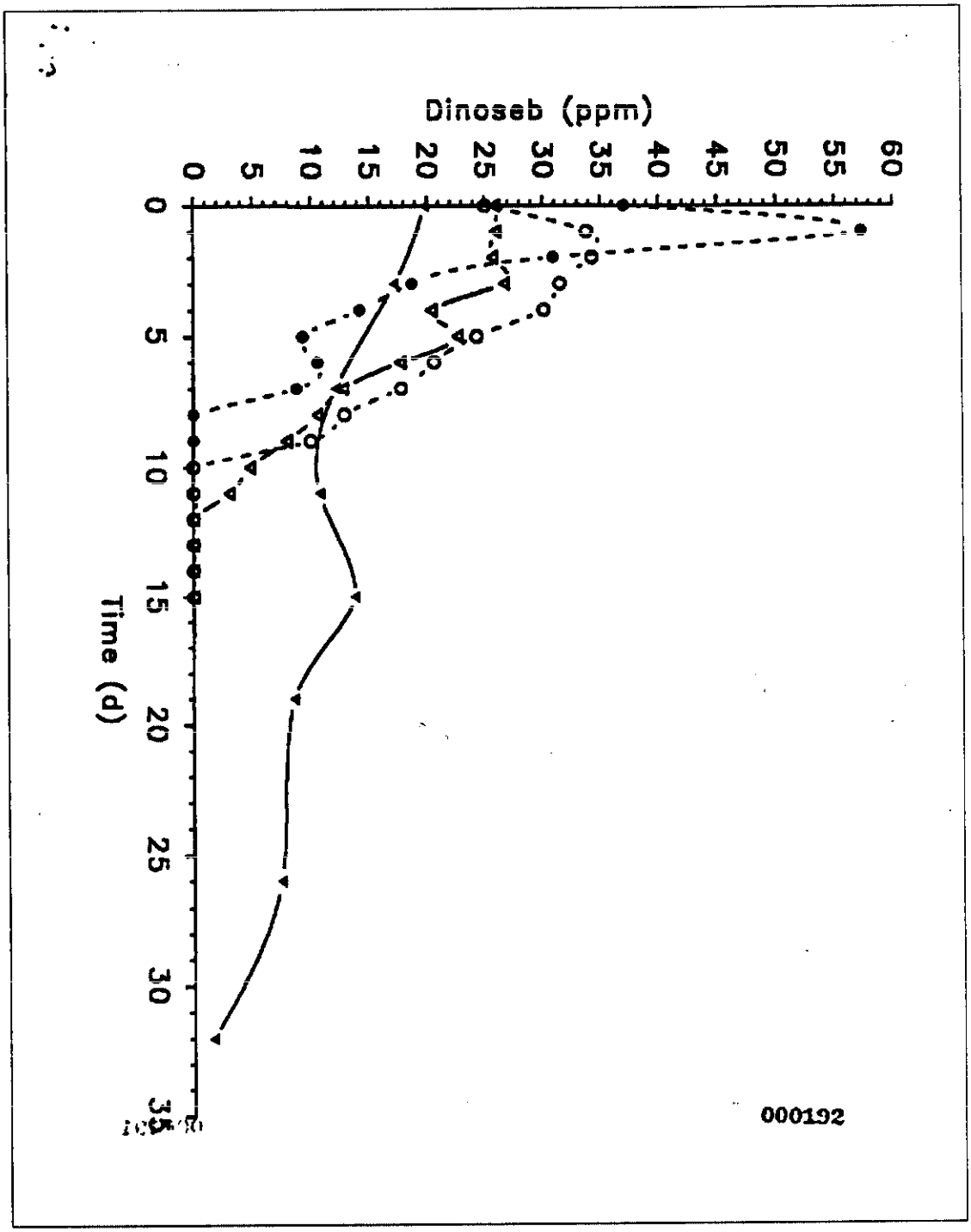
- o aqueous dinoseb
- • soil dinoseb
- ◇ unidentified intermediate

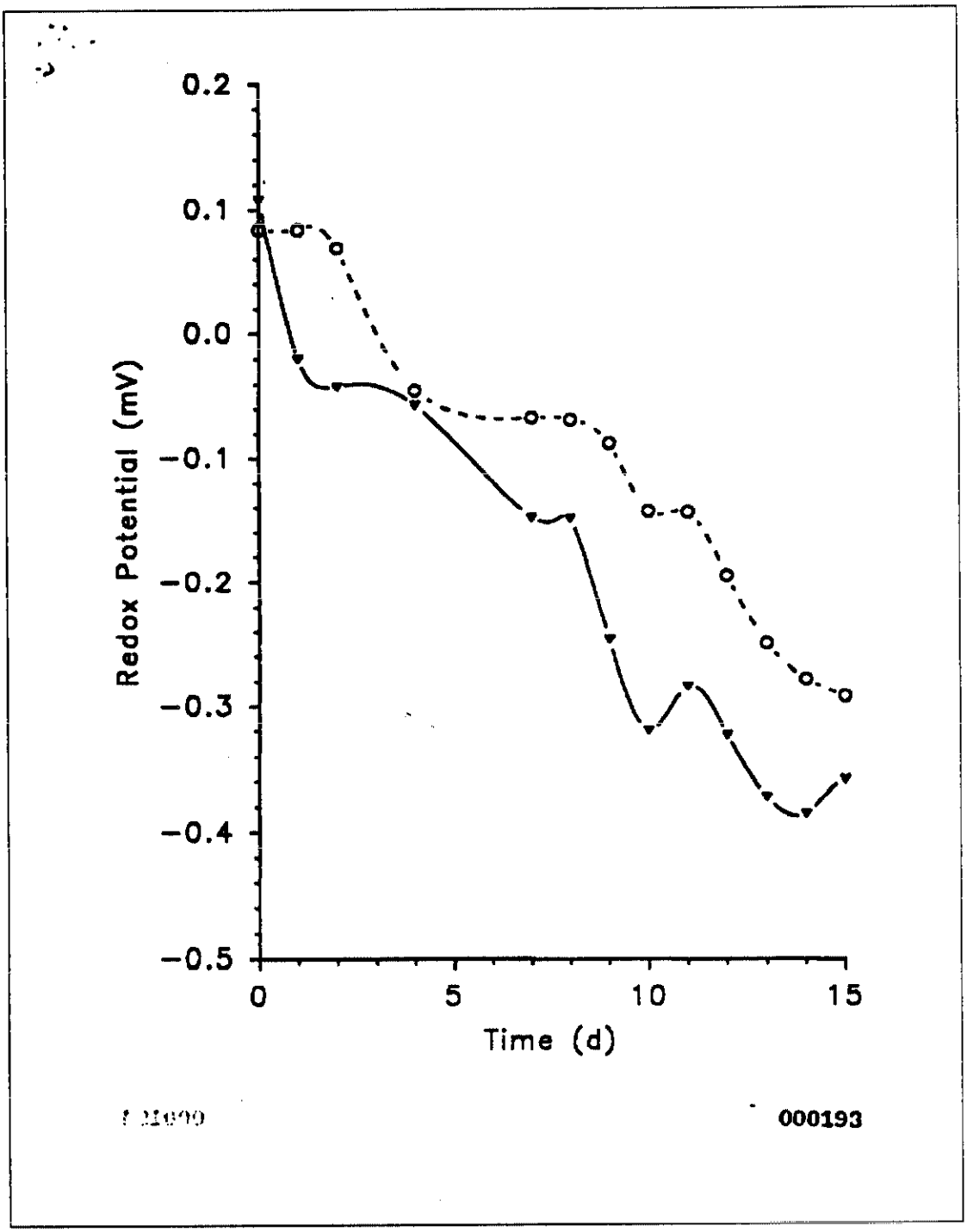
000190

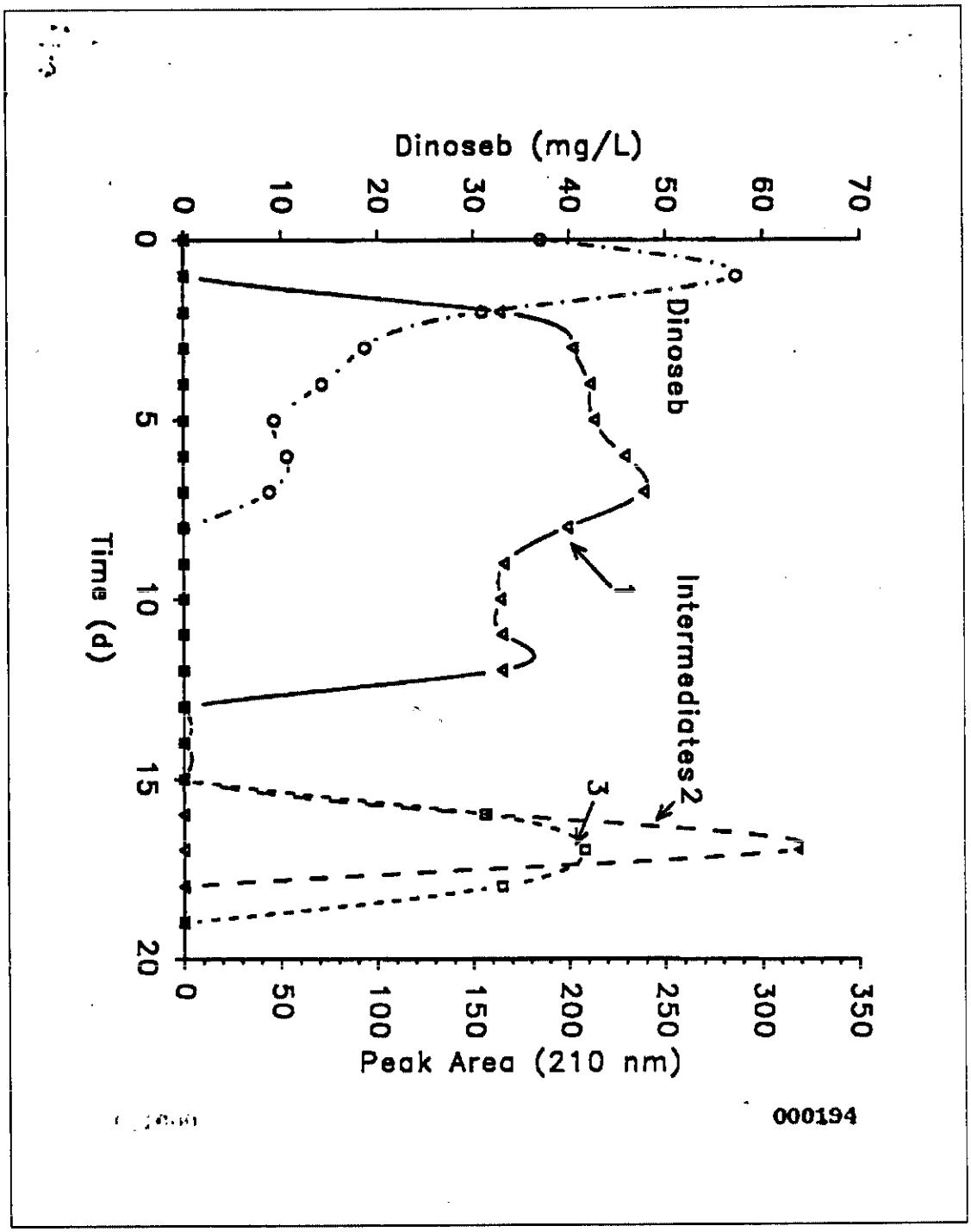
Figure 5. Dinoseb removal and intermediate accumulation and removal in 2,000 kg treatments of the acutely contaminated soil. Reactors received approximately 2,000 kg of contaminated soil, 2,000 L of phosphate buffer pH 7, 40 kg of starch and 1 L of treated soil slurry from the 315 kg reactors.

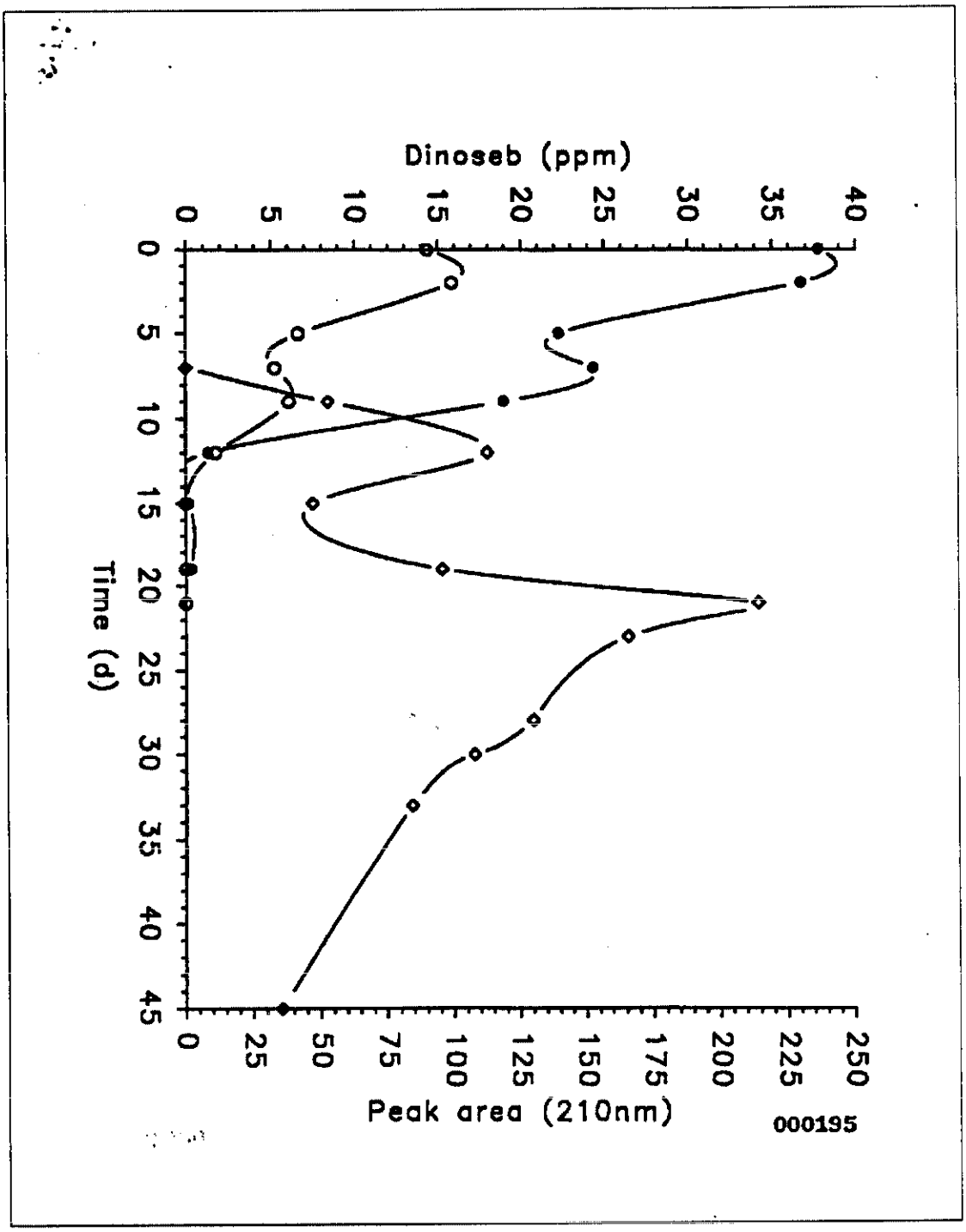
- ○ Aqueous dinoseb
- ● Soil dinoseb
- ◇ Unidentified intermediate

Figure 6 Cost comparison of various remediation techniques.

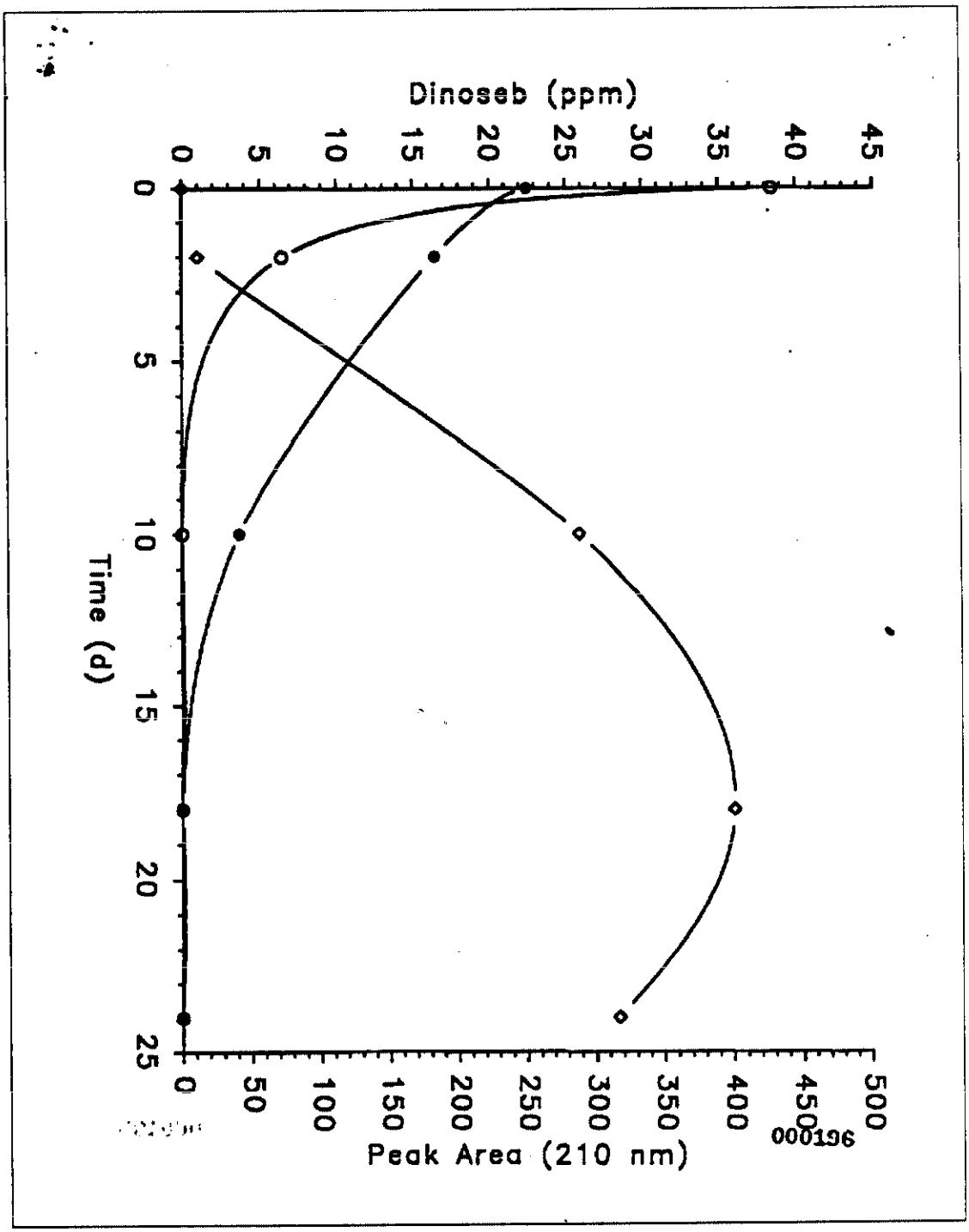

Dinoseb (ppm)
0 5 10 15 20 25 30 35 40 45 50 55 60
0 5 10 15 20 25 30 35
Time (d)
000192

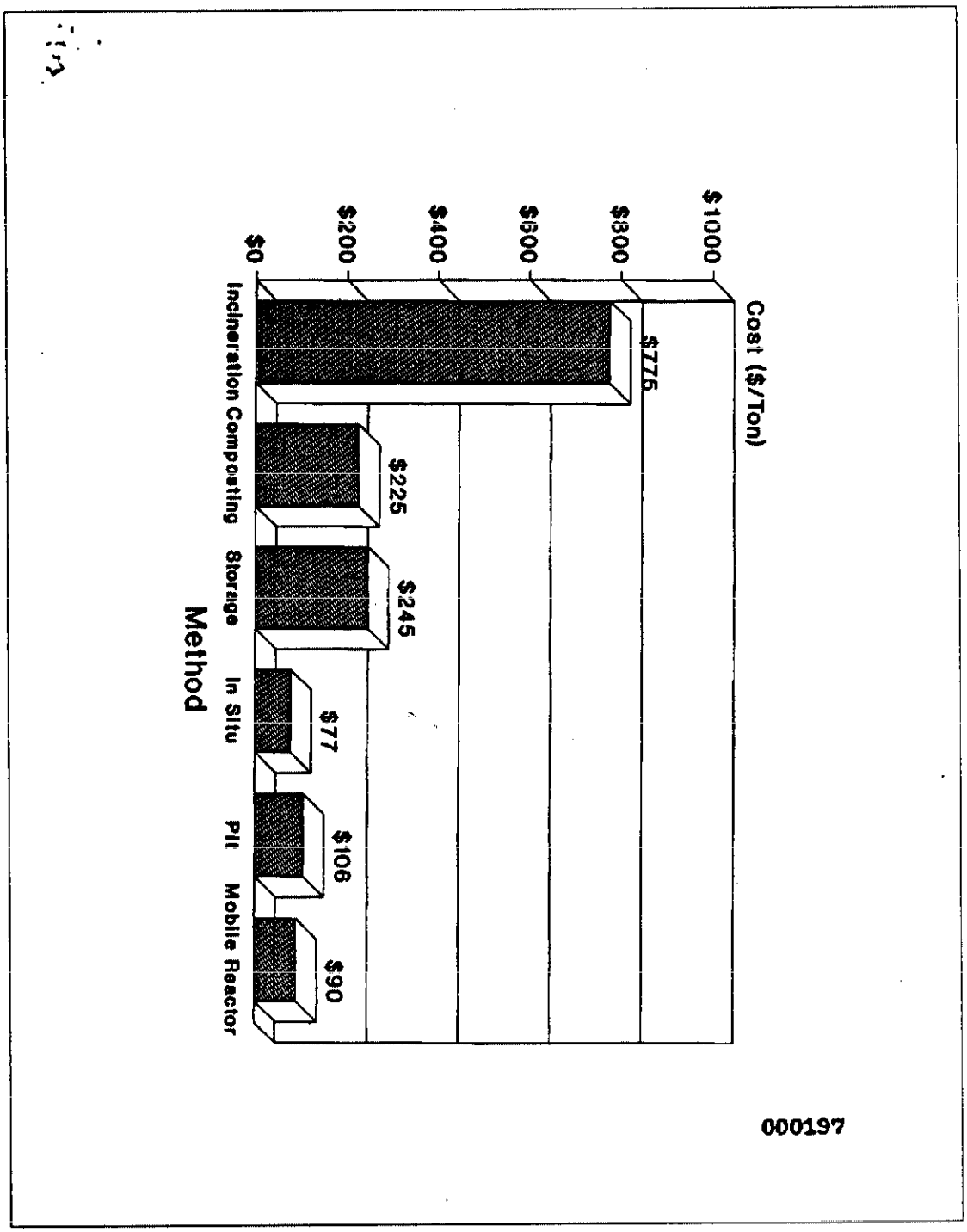

0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
−0.5
Redox Potential (mV)
0
5
10
15
Time (d)
000193


Dinoseb (mg/L)
0
10
20
30
40
50
60
70
Time (d)
0
5
10
15
20
Dinoseb
Intermediates
1
2
3
0
50
100
150
200
250
300
350
Peak Area (210 nm)
000194


Dinoseb (ppm)
0
5
10
15
20
25
30
35
40
Time (d)
0
5
10
15
20
25
30
35
40
45
Peak area (210nm)
0
25
50
75
100
125
150
175
200
225
250
000195

WC-00056 (44)


Dinoseb (ppm)
0
5
10
15
20
25
30
35
40
45
Time (d)
0
5
10
15
20
25
0
50
100
150
200
250
300
350
400
450
500
Peak Area (210 nm)
000196


$0
$200
$400
$600
$800
$1000
Cost ($/Ton)
Incineration
$776
Composting
$225
Storage
$245
In Situ
$77
Pit
$106
Mobile Reactor
$90
Method
000197

WC-00057 (1)

722 Victor Avenue
Chubbuck, Idaho 83201
17 January 1992

Mr. Jerry Lyle
Acting Deputy Assistant Manager
Environment Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, Idaho 83401-1562

Dear Mr. Lyle,

I have just finished reading the Proposed Plan for a Cleanup of Unexploded Ordnance at the INEL. Please accept this letter as a comment on that plan.

The American public has held you hostage to reviews of planning and action where we do not have, nor can we reasonably gain, sufficient information to make an informed decision. The efforts taken to publish the plan, and to hear comments on it, are ludicrous wastes beyond the physical problems of hazardous materials at INEL. Please accept my apologies for the present necessities demanded by the public.

I'll accept the fact that there is unexploded ordnance at INEL, and that proper authority intends to make the area as safe as reasonably possible. Very few of us need to be in those restricted areas, but safety must be provided to those with need, both now and future, so let's clean it well as we go.

#W6-01
09

The real issue is this: you have a clean-up to do; please do it efficiently, effectively, and cost-consciously. Take seriously the trust placed in you by thousands of people who realize their own inability to complete a necessary task.

These comments apply equally well to the Proposed Plan for Interim Action to Reduce the Contamination Near the Injection Well ...TAN, INEL. Please enter a copy of this letter as written comment on that plan, also. If that is not possible, please make no response- you have enough to do without preparing another letter.

Thank you for the your efforts, and those of your staff, in KEEPING INEL a safe place. The best known technology has always been used, and there is nothing wrong that a little less criticism won't help.

Sincerely,

R. "Ham" Hamilton

RECEIVED
JAN 28 1992
A
FOR
R...
WASTE

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WC-00058 (1)

January 23, 1992

Mr. Jerry Lyle, Acting Deputy Assistant Manager
Environmental Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, ID 83401-1562

Dear Mr. Lyle:

Thank you for the opportunity to comment on the proposed plan for a clean up of unexploded ordinance locations at the Idaho National Engineering Laboratory. The plan states that this is an interim action motivated by the potential explosive hazard associated with uncontrolled detonation of unexploded ordinance devices. The stated preferred alternative three involves a cost of approximately 2.5 million dollars. The stated goal of the plan is to reduce the safety hazard to INEL personnel due to the unexplodad ordinance and risk of ingestion or inhalation of high explosive residues present on site. The plan and the four alternatives as presented are unacceptable for the following reasons:

1) The extent of the problem has not been determined. #W7-01 03

2) The plan calls for a clean up of only an exceedingly small area. Approximately 10 miles of power line road lie within the former naval artillery range. The total area proposed to be cleaned up here is only 118 acres.

3) Apparently no studies have been done to demonstrate whether common TNT manufacturing contaminants are hazardous or whether a clean up of affected soils is warranted.

I believe it is premature to propose a plan to move in an undetermined amount of soil to an undetermined place to eliminate an undetermined hazard. Has anybody bothered to contact the Navy to obtain their input in resolving this hazard issue? Perhaps the military experts who designed and provided this ordinance could be brought into the loop to effect a clean up. Certainly the problem here must be relatively insignificant since the INEL managing staff has elected to do nothing about it for over 40 years. The outline of this interim plan suggests that the problem is far greater than that outlined within the plan. #W7-02 05 #W7-03 03

000199

Will this clean up cost $10 million, $20 million? Who knows. Let's first determine whether a hazard exists. If a hazard exists, where does the hazard exist? Once these two things are determined with certainty then a plan and proposal for clean up may be formulated.

I would like to see a study completed to determine whether there is a problem, the extent of the problem if it exists, and finally, making a recommendation as to the course of action necessary to eliminate the problem before funds are allocated for a clean up proposal.

#W7-03
03

Sincerely,

Peter F. Toft

RECEIVED
JAN 30 1992
FOR IN ... ENTAL ... NO ...
WASTE MANAGEMENT

League of Women Voters of Moscow
514 East Morton St.
MOSCOW IDAHO 83843

January 26, 1992

Mr. Jerry Lyle, Acting Deputy Assistant Manager
Environmental Restoration and Waste Management
U.S. Department Of Energy
Idaho Field Office
785 DOE Place - MS 3902
Idaho Falls, ID 83401-1562

Subject: Request for a technical briefing on TAN and Ordnance and a 30 day extension on public comment period

Dear Mr. Lyle:

Please accept this letter as a formal request from the League of Women Voters of Moscow to the Department of Energy to hold a technical briefing in Moscow on the RI/FS and proposed plan to address groundwater contamination at the Test Area North and the proposed plan for a cleanup of unexploded ordnance locations at the INEL. This technical briefing is required in order for the League to formulate meaningful written comments on the RI/FS and the proposed plans. #W8-01 08

It is essential that this technical briefing be held in Moscow since the closest public meeting on these projects is 250 miles away. In February, that is a six hour (or longer) one-way drive, depending on the weather. Neither League members nor the general pubic can afford to take one or two days off work to attend a public meeting in Boise, no matter how interested they are in the issue.

The League of Women Voters of Moscow further requests the DOE extend the public comment period an additional 30 days beyond the current February 12, 1992 deadline. This is to allow the League sufficient time to formulate written comments based on the information presented at the technical briefing. #W8-02 07 It is our understanding that the earliest the DOE could hold a technical briefing is February 10. This is only two days before the end of the current comment period and certainly not sufficient time for the League or the general public to prepare meaningful comments on the material presented. #W8-03 08 In addition, extending the comment

000201

League of Women Voters of Moscow

MOSCOW IDAHO 83843

period will allow the briefing to be scheduled the end of February. This will give the League time to advertise the technical briefing and thereby increase public attendance at the meeting. A decision to extend the comment period now will also allow the DOE to make the announcement at the public meetings scheduled in the southern part of the state February 4-6.

#W8-03 08

The League appreciates your thoughtful consideration of our request. Please advise me of your decision at your earliest convenience so that we may make the necessary arrangements. I can be reached during the day at (208) 885-7400 or in the evening at (208) 883-0759.

Sincerely,

Lynn Minaur
President

000202

Ordnance

Ron Hover
1405 1st St
Okla Falls, Id 83401

It is suggested that bio. remediation of the ordnance contaminated soil could be achieved via, soil washing and activated sludge waste treatment using activated "bugs" for the specific compounds. A technology which has been proven on a broad spectrum of organic pollutants and industrial by-products.

#W9-01
26

000203

Leigh-E Hawkins

In response to alternative 3 of "4" I am preferring alternative "3" Reardon for this is what is in Alt "3" where they incinerate the contaminats and spent shells. I feel that "composting" is just setting the problem aside:--not solving it.

Leigh-E-Hawkins
P.O. Box 542
Burley Ida. 83318,

#W10-01
16

#W10-02
23

000204

Unexploded Ordnance Interim Action

Written Comment Sheet

The comment period on the proposed interim action for cleanup of unexploded ordnance will run until March 13, 1992. You may wish to submit written comments tonight, or mail them later to: Jerry Lyle, Environmental Restoration and Waste Management, DOE Idaho Field Office, 785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562.

Comment(s):

I would like a copy of the followings viewgraphs used in the presentation:

91-309-1-7; 91-309-1-9; 91-309-1-16; 91-309-1-13,

85-505-2-8; 85-505-1-15; 85-505-1-16; 85-505-2-9; 85-505-3-2; 85-505-3-10;

#W11-01
38

Name: Mark E. Lintz

Mailing Address: apt 1238 Lincoln Court Rupert 83350

000205

Unexploded Ordnance Interim Action

Written Comment Sheet

The comment period on the proposed interim action for cleanup of unexploded ordnance will run until March 13, 1992. You may wish to submit written comments tonight, or mail them later to: Jerry Lyle, Environmental Restoration and Waste Management, DOE Idaho Field Office, 785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562.

Comment(s):

Why isn't the Navy providing funds for cleanup of this mess?
Why isn't the Navy going to provide personnel?
Why isn't the Navy doing the paper search?
Why weren't funds ~~about~~ set aside before now?

#W12-0106

Name: Nan Norton

Mailing Address: Rt 4 Box 4111
Burley, ID 83318

000206

WC-00064 (1)

Unexploded Ordnance Interim Action

Written Comment Sheet

The comment period on the proposed interim action for cleanup of unexploded ordnance will run until March 13, 1992. You may wish to submit written comments tonight, or mail them later to: Jerry Lyle, Environmental Restoration and Waste Management, DOE Idaho Field Office, 785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562.

Comment(s):

The war (WWII) has been over for quite sometime. In the early 1970's during a brushfire some of this ordanance exploded. Why has it taken so long to do anything about this problem? Why didn't the Navy clean it up in the 1950's?

#W13-01 06

Name: Cynthia Samuelson

Mailing Address: pt 1 Box 410 Rupert, Id 83350

000207

League of Women Voters of Moscow

MOSCOW, IDAHO 83843

February 8, 1992

Mr. Jerry Lyle, Acting Deputy Assistant Manager
Environmental Restoration and Waste Management
U.S. Department Of Energy
Idaho Field Office
785 DOE Place - MS 3902
Idaho Falls, ID 83401-1562

Subject: Request for a written response to the League's request for a technical briefing on TAN and Ordnance and a 30 day extension on public comment period

Dear Mr. Lyle:

Please accept this letter as a formal request for a written response to the League's January 26, 1992 request to the Department of Energy to hold a technical briefing in Moscow on the RI/FS and proposed plan to address groundwater contamination at the Test Area North and the proposed plan for a cleanup of unexploded ordnance locations at the INEL. As was noted in our January 26 letter, this technical briefing is required in order for the League to formulate meaningful written comments on the RI/FS and the proposed plans. The League also requested the DOE extend the public comment period an additional 30 days beyond the current February 12, 1992 deadline.

#W14-0108

#W14-0207

The League mailing address is:

514 East Morton Street
Moscow, Idaho 83843

Sincerely,

Lynn Mineur
President

RECEIVED
FEB 10 1992
ADMINISTRATIVE RECORD
FOR ENVIRONMENTAL
RESTORATION AND
WASTE MANAGEMENT

000208

THE LEAGUE OF WOMEN VOTERS OF MOSCOW SUPPORTS THE USE OF RECYCLED PAPER

11 February 1992

Mr. Jerry Lyle, Acting Deputy Asst. Manager
Environmental Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place, MS 3905
Idaho Falls, ID 83401-1562

Dear Mr. Lyle:

Concerning the "Proposed Plan for a Cleanup of Unexploded Ordnance Locations at the Idaho National Engineering Laboratory," January 1992.

On page 9 of this proposal there is a Cost Comparison of Interim Action Alternatives. I have read the plan and examined the proposed costs and cannot seem to understand why it should cost $60 per hour for such things as fabrication and installation and $80 per hour for documentation, labor/supervision, record search, safety analysis, remedial design, ordnance detonation. I can understand that this work takes specialized training, in some cases extensive training and experience. However, it seems to me that much of it will consist of making and installing such things as signs and barriers, searching files in cabinets or on computer disks, etc. and I cannot believe that people doing these things will or ought to be paid at such a rate ($115,200-153,600 per year). Even reducing these amounts by the cost of benefits paid by the employer and the necessary "overhead," those costs seem extremely exhorbitant.

#W15-01
34

Must government business always be done this way? I believe not but must admit that I have very little hope for improvement.

Sincerely,

Marjorie Boren

Marjorie D. Boren
1002 East Bannock
Boise, Idaho 83712

RECEIVED FEB 1 3 1992

000209

Unexploded Ordnance Interim Action

Written Comment Sheet

The comment period on the proposed interim action for cleanup of unexploded ordnance will run until March 13, 1992. You may wish to submit written comments tonight, or mail them later to: Jerry Lyle, Environmental Restoration and Waste Management, DOE Idaho Field Office, 785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562.

Comment(s):

I am in favor of the second alternative, not the "preferred" particularly since it only affects site workers. Scraping and capping would be sufficient. Transporting and incinerating to the pagans is much more costly, and also much more dangerous to potentially many many more humans than leaving it as is. The Navy should have been responsible for their actions years ago -- and I hope we learn to be more responsible for our actions within our states, not decades -- including the USAF + their "interim" intentions for S. Idaho.

Having lived in S. Nevada when underground bombs were continually being exploded, they couldn't tell if your head down there & hearing it be blown up underground is real?

#W16-01 15

#W16-02 17

#W16-03 06

#W16-04 31

000210

Name: Christine L Boan

Mailing Address: 160 Williams St.
Boise Idaho 83706

[Also -] could somebody there tell me if this is true or not -- that "hazardous waste materials may be used for making bombs -- one of the reasons →

we want hazardous waste from other countries here."
and

2) Will there be public meetings as to how the country and world's hazardous waste will be managed here in Idaho, since it appears Idaho has been selected to be the world's repository?

Thank you.

000211

RECEIVED FEB 2 1 1992

Unexploded Ordnance Interim Action
Written Comment Sheet

TO: Jerry Lyle, Environmental Restoration and Waste Management
DOE Idaho Field Office
785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562

COMMENTS:

Since Alternative 4 is so similar to Alternative 3, I believe we should try to make composting more implementable before sending the materials to be incinerated. I would like to know where the materials will be sent for off-site incineration? I would also like to know how these sites are approved and chosen. #W17-01 21

Future development at Central Facilities Area Gravel Pit is mentioned in your proposed cleanup plan. (page 2, last paragraph) I would like to know what this future development is? #W17-02 17

How will fugitive dust emissions be controlled to prevent airborne contamination and ensure worker safety? #W17-03 37

#W17-04 10

Thank-you.

Carolyn Hondo

Carolyn Hondo
412 HIllcrest Rd.
Burley, Idaho 83318

P.S.
The meeting in Burley was appreciated! 000212

WC-00069 (1)

RECEIVED MAR 17 1992

Written testimony for TAN, INEL NAC 91-09
Interim Action at Injection Well, and regarding
Unexploded ordinance

16th Pl
Moscow, Id 83843
10 Mar 1992

After attendance at the Technical briefing 3-9-92 Moscow, Id on the Proposed Plan for an interim action to remove contamination near the injection well and contaminated groundwater at Test Area North, INEL, and the clean up of unexploded ordinance locations at INEL, I would like to submit the following testimony.

Though I appreciate the extended deadline for written testimony on the proposed interim actions regarding ground water contamination near the injection well and unexploded ordinance, I find it deplorable that no public hearing was scheduled to obtain comments from the citizens of north Idaho. As the DOE-Id is the single largest employer in this state, and as the Snake River, whose aquifer DOE-Id has contaminated, is a major body of water extending well into the north of Idaho, I find it blatant regionalism to contend the citizens of north Idaho are merely interested and not affected by the operations of INEL. I demand that in the future DOE-Id follow the body and letter of it's community relations plan by providing public hearings in the north and not just the center of Idaho.

#W18-01
08

Regarding the proposed plan for an interim action to remove contamination near the injection well and contaminated groundwater, I strongly urge the DOE-Id adopt Alternative 4, with the following changes instead of disposing of processed water in the TAN disposal pond, the water be released into a land evaporation pond. If extracted ground waters are processed by ultraviolet light as outlined under alternative 4, the initial waste product will be benign organic and inorganic materials

000213

easily dispersed in the surrounding environment. Should the preferred alternative 2 be pursued, the initial product will be hazardous waste requiring further processing and disposal at a site that presently does not exist. I am well aware of the DOE-Id contention that alternative 4 would require too much research and design prior to implementation, but by your own admission this research and design process would require only a few months to complete. If the DOE-Id assertion that it will take 40 yrs. before contaminated ground waters reach drinking water sites, it seems only plausible that the DOE could expend a few extra months developing technology that will truely clean the environment rather than producing yet another hazardous waste. I strongly urge, also that a lined evaporation pond be the final repository for waste waters generated regardless of alternative used. A lined evaporation pond will prevent further contamination of the Snake River Aquifer by waste waters the DOE-Id publicly admits will not meet drinking water standards. Such a lined pond would also prevent further degradation of the aquifer should DOE-Id oppose a malfunction in the processing of extracted ground waters - if the disposal pond is unlined there is grave potential for re-release of contaminated fluids washing the aquifer yet again -; and such a lined pond would prevent the possibility of driving contaminants in the soils under the TAN disposal pond further toward the aquifer. I realize the DOE-Id does not consider this a concern, that I feel we have not shown sufficient evidence to substantiate such a claim.

For the plan of action on unexploded ordinance, I support a combination of alternatives 3 and 4. I find it unconscionable that DOE-Id has not already posted administrative barriers around unexploded ordinance sites (as was confirmed in the 3-9-92 Moscow, Id tele-conference). It shows a deplorable unconcern of the employees of DOE-Id.

#W18-02
24

000214

Alternative 2 should be immediately implemented regardless of any further plans of actions. Following implementation of alternative 2, DOE-RL should proceed agents with alternative 4. Disposal of unexploded ordinance under these guidelines offers an environment that is benign to the environment and employees, as opposed to proposed alternative 3 which will produce mixed waste that will require special handling and storage, as well as increasing risk to the environment and employees.

#W18-02 24

#W18-03 19

These written comments are submitted by

Henry C. McReynolds

NEW Public

Moscow ID 83843

000215

Donna N.
Dan H.
Reuel S.
Lisa G.

Snake River Alliance

P.O. Box 1731 · Boise, ID 83701 · 208/344-9161
P.O. Box 4000 · Ketchum ID 83340 · 208/726-7271
P.O. 318 E. Center · Pocatello ID 83201 · 208/234-4752

Friday (March) 13, 1992

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 2

To Jerry Lyle	From Linda Bacon
Co.	Co.
Dept.	Phone #
Fax # 526-1184	Fax #

Wayne Pierre
Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

Dean Nygard
Division of Environmental Quality
1410 North Hilton
Boise, ID 83706

Jerry Lyle
Department of Energy Field Office, Idaho
785 DOE Place
Idaho Falls, ID 83401-1562

Gentlemen:

The following comments are submitted on behalf of the 1,200 individual, family, and business members of the Snake River Alliance.

Proposed Plan for a Cleanup of Unexploded Ordnance Locations at the Idaho National Engineering Laboratory

Common sense dictates the removal of unexploded ordnance wherever it is found at the INEL. It undoubtedly presents potential perils to anyone at the Site. The Alliance is more comfortable with the "qualitative risk assessment" driving ordnance removal than we are with risk assessments that purport to be quantitative but are in fact nothing more than "artifacts of the modeling assumptions used."

#W19-0104

However, the Alliance has serious reservations about the Preferred Alternative (Detonation and Disposal On-Site, Off-Site Incineration of Contaminated Soil). It is impossible to support a cleanup plan for INEL that may cause environmental contamination elsewhere. We understand that incineration of soil contaminated with high explosives is an established technique. But we have once again been asked to support a plan that degenerates into verbal assurances halfway through.

#W19-0220

Proposed Plan for an Interim Action to Reduce the Contamination Near the Injection Well and in the Surrounding Groundwater at the Test Area North, Idaho National Engineering Laboratory

Common sense dictates that contaminated groundwater must be addressed.

However, the Alliance has serious reservations about the Preferred Alternative (Groundwater Extraction and Treatment by Air Stripping, Ion Exchange, and Carbon Adsorption). It is impossible to support a cleanup plan which is only partially developed. Since the agencies have not designed the treatment facility itself, it

000216

is impossible for us (or you) to evaluate its impacts, particularly on air quality.

Community Involvement Process

The Federal Facilities Agreement for INEL depends strongly on the implementation of the Community Relations Plan for responding to "the need for an interactive relationship with all interested community elements, both on and off INEL, regarding activities and elements of work undertaken by DOE at INEL under this Agreement." During the comment period and hearings on the FFA, members of the Alliance and the public were repeatedly assured that the CRP is a "living document" and that we would be fully involved in its evolution.

Certainly, public participation is a dynamic process. Just as certainly, it cannot be under the sole control of government agencies.

I quote from a letter from Mr. Lyle to Lynn Hineur, President of the League of Women Voters of Moscow: "We recognize the need to communicate with the public about cleanup issues at the INEL over the next 25 years. During this time frame the Community Relations Plan will be updated periodically to reflect the approach the agencies will take to involve interested citizens. Considerations will be made for those living near the Site whose land and health are potentially effected by environmental conditions and operations. The needs of other interested citizens and organizations in the state concerned about environmental quality and ongoing operations at the INEL will be considered as well."

It is clear that the agencies intend to redefine their own roles and the role of the public. This cannot happen.

#W19-03
09

Sincerely,

Beatrice Brailsford
Eastern Idaho Coordinator

000217

WC-00071 (1)

Unexploded Ordnance Interim Action

Written Comment Sheet

The comment period on the proposed interim action for cleanup of unexploded ordnance will run until March 13, 1992. You may wish to submit written comments tonight, or mail them later to: Jerry Lyle, Environmental Restoration and Waste Management, DOE Idaho Field Office, 785 DOE Place-MS 3902, Idaho Falls, ID 83401-1562.

Comment(s):

It is likely a good idea to clean up this debris as it could be dangerous now and in the future to people.

#W20-01
14

Name: Phyllis Faye Jolette

Mailing Address: Box 602, Rupert, ID 83350

000218

League of Women Voters of Moscow

MOSCOW, IDAHO 83843

March 12, 1992

RECEIVED

MAR 16 1992

WASTE MANAGEMENT
OPERATIONS DIVISION

Mr. Jerry Lyle
Acting Deputy Assistant Manager
U.S. Department of Energy
Idaho Field Office
785 DOE Place - MS 3902
Idaho Falls, ID 83401-1562

Mr. Walter N. Sato
Acting Director
Environmental Restoration Division
DOE Idaho Field Office
785 DOE Place, MS 3902
Idaho Falls, ID 83401-1562

Subject: Comments to be included in the public record for:

—Scoping for the RI/FS of ground water beneath the Test Area North;
—Proposed Plan for an Interim Action near the Injection Well at TAN: and
—Proposed Plan for clean-up of Unexploded Ordnances at INEL

Dear Mr. Lyle and Mr. Sato:

The League of Women Voters of Moscow has a formal INEL review group that meets at least monthly, reviews INEL material and makes recommendations to the league board for action. This group met January 23, February 27, March 5 and March 12 to review and discuss information presented in the fact sheet and two proposed plans transmitted under one "Dear Citizen" cover sheet dated January 8, 1992 and to prepare these written comments. In addition, the league general membership attended a presentation by the Director of the Environmental Defense Institute; requested, publicized and attended a telephone technical briefing by DOE-Idaho; and reviewed the clean-up projects at two league board meetings.

The comments of the League of Women Voters of Moscow on these three projects will be addressed under two major headings:

1) Process and
2) Scoping and Proposed Plan

000219

League of Women Voters of Moscow
MOSCOW, IDAHO 83843

PROCESS

The league objects to the requirements that comments on two of these three projects be directed to one individual (Mr. Lyle), while comments on the third are to be directed to someone else (Mr. Sato). This process is confusing and requires the public to submit two sets of comments where one should be enough. It is wrong for the DOE/State/EPA to be able to send all this material under one cover letter, all bound in the same booklet, and yet require the public to submit comments to two sources in order to retain their rights under the law. The league requests that all comments received by either party (Mr. Lyle or Mr. Sato) regarding these three projects be a part of the public record and be included in the responsiveness summary. The league further requests that for all future projects only ONE (1) contact person be designated to receive written public comments for any group of clean-up projects that are considered during the same public meeting.

The league objects to the format used to communicate to the public in the fact sheet and two proposed plans transmitted under the "Dear Citizen" cover letter dated January 8, 1992. This format resulted in the reader being forced to work with a document that had three (3) sets of pages numbered 1 through 4 and two (2) sets that continued through page 12. The material is technical enough without making the public figure out which page 3 one is looking at. The material was made even more confusing by the fact that the order in which the projects were presented in the stapled booklet did not match the order in which the projects were discussed in the "Dear Citizen" cover letter. This format was so remarkably difficult to use that the league began to question if the goal of this presentation truly was to communicate with the public.

#W21-01
09

The league finds that the narrative is often difficult to understand due, in part, to over-use of acronyms. The league requests all future fact sheets and proposed plans include a side bar every two pages that defines the acronyms.

The league continues its protest regarding the exclusion of northern Idaho from the public meetings on these projects. We request language in the Community Relations Plan that guarantees that at least one meeting on each project be held in the northern part of the state. The league also wishes the record to show that telephone calls are an inadequate means to effectively communicate much of the technical information necessary for the public to adequately evaluate the proposed alternatives for these clean-up projects. The officials who made this decision have obviously never spent 2 1/2 continuous hours trying to comprehend and assimilate unfamiliar technical data presented over the phone. The concentration required of the public to participate in this process was unreasonable. Yet, this was the only avenue offered those in northern Idaho. The 22 people who attended this session have demonstrated their commitment to making the public process work. The league

League of Women Voters of Moscow

MOSCOW, IDAHO 83843

salutes them. The league also recognizes the outstanding effort of the EE&G scientist, Jerry Zimmerle, who spent most of those 2 1/2 hours speaking to us over the telephone. However, the league continues to protest the decision that made it necessary for him to do so.

SCOPING AND PROPOSED PLAN

Scoping for TAN RI/FS

The League of Women Voters of Moscow requests that the RI/FS include an analysis and remediation plan for all of the contaminants listed in binder 1100, section 1105.2 in the information repositories. In light of the current public review of drinking water standards and DOE derived concentration standards, the league finds it prudent to anticipate a possible revision downward. Given the breadth of the study and the cost involved, the public health and safety will best be served by the broadest possible analysis.

Studies must include an overall analysis of the impact on local and surrounding water tables and potential impact on off-site ground water users (i.e., irrigators) when determining water pumping rates during treatment. This model must include a worse case drought scenario projected out over the life of the treatment process.

The league finds the elimination of toxic and hazardous wastes as a result of the clean-up process to be of a higher value than the short-term lowering of costs. The ground water clean-up under TAN is required because, until 1972, wastes were disposed of according to the rules of the day. It is not prudent to generate wastes that may at some future point become the target of yet another publicly funded clean-up project.

The league requests that all alternatives include detailed descriptions and quantities of wastes to be recovered, and include specific disposal destinations.

Interim Action:

The league finds alternatives 1 through 3 unacceptable. The league finds the elimination of toxic and hazardous wastes as a result of the clean-up process to be the highest priority in evaluating alternatives. Therefore, the league strongly urges the DOE-Idaho to adopt alternative 4, with the following change: instead of disposing of processed water in the TAN disposal pond, it be released into a lined evaporation pond. The reasons for supporting alternative 4, with a lined evaporation pond, are these:

League of Women Voters of Moscow

MOSCOW, IDAHO 83843

1) treatment by ultraviolet light would produce benign waste as the first step. Waste products produced by alternative 2 and 3 are hazardous or mixed waste and will require specific handling and storage (at yet unknown sites). The league is aware that design and implementation will take longer with Alternative 4, but we strongly feel that the alternative reduction in hazardous materials warrants the extended time and energy. If, as the DOE contends, contaminated wastes will take 100 years to reach any surrounding drinking wells, DOE-Idaho certainly has the time to expend designing an ultraviolet process.

2) A lined evaporation pond would prevent further contamination of the Snake River Aquifer by waste waters that will not meet drinking water standards; it would also prevent future degradation of the aquifer should DOE-Idaho suffer a malfunction in the processing of extracted ground waters, and would prevent the possibility of driving contaminants already under the TAN disposal pond further into the aquifer (the league realizes DOE-Idaho maintains this is not a consideration, but we do not find they have to show sufficient research to substantiate their claim).

Ordnances

For the plan of action of unexploded ordnances, the league supports a combination of Alternatives 2 and 4. The league finds it unconscionable that DOE-Idaho has not already set up administrative barriers (as was confirmed at the 3/9/92 telephone technical briefing) to protect employees at INEL. This stage should be implemented immediately for employee safety. Disposal of ordnances should follow guidelines espoused under Alternative 4. This proposed plan again offers end product materials that are benign. The league does not support alternative 3 that will produce mixed waste that will increase need for special handling and risk to the environment and employees.

#W21-02
24

#W21-03
19

Respectfully submitted,

Lynn Mineur

Lynn Mineur
President

Jennifer O'Laughlin

Jennifer O'Laughlin
Secretary

League of Women Voters of Moscow

000222

WC-00073 (1)

Environmental Defense Institute

P.O.Box 8812
Moscow, Idaho 83843
208-882-5071

EID

P.O. Box 220
Troy, Idaho 83871
208-835-6152

Received 03-31-92

FINAL

COMMENTS

on

GROUND WATER CONTAMINATION

and

PROPOSED PLAN

for an

INTERIM ACTION

at

IDAHO NATIONAL ENGINEERING LABORATORY

TEST AREA NORTH

Submitted by

Chuck Broscious

on behalf of the

Environmental Defense Institute

March 9, 1992

"The ultimate test of a moral society is the kind of world it leaves to its children." [Dietrich Bonhoeffer]

proltanclean.309

000223

Printed on Recycled Paper

Introduction

The Environmental Defense Institute (EDI) would like to express its appreciation to Department of Energy (DOE) for finally including the organization on its INEL mailing list after over a year of exclusion. Unfortunately, this inclusion comes precisely at a time when northern Idaho has been summarily excluded from the public participation process provided in the INEL Community Relations Plan (CRP). The affected community is defined in the CRP as "interested citizens, public officials, agencies, groups and organizations in the State of Idaho." [CRP @ 1]

EDI supports the League of Women Voters of Moscow position [11] that a violation of the CRP exists with the exclusion of northern Idaho from full public participation process. Moreover, EDI challenges changes in the definition of affected community into two catagories of: 1.) "...those living near the Site whose land and health are potentially affected by environmental conditions and operations; and 2.) those interested citizens and organizations in the State concerned about environmental quality and ongoing operations at the INEL..." [Lyle @ 1] These changes in definition have been made without due process and Record of Decision (ROD) legally provided for in the INEL Federal Facilities Agreement and the INEL CRP. [CRP @ 13]

The phone conference call planned for 3/9/92 at the University of Idaho which reportedly will offer a technical briefing on the proposed Test Area North (TAN) cleanup plans, fundamentally and procedurally do not meet the CRP criteria. Clearly, DOE and the other agency principals have responded to the substantive critiques offered in the north by adolescent avoidance and denial. Being the single largest employer in the State - larger than the combined State timber industry - INEL dominates the economic and politic of the State. Moreover, the extreme dominance in southeastern Idaho decreases exponentially further downstream from INEL. The geologic fact remains that INEL has contaminated the Snake River Plain Aquifer which is the principal source for the Snake River flowing north through Lewiston, Idaho. Therefore, no legitimate contention can be made by DOE that northern Idaho is not part of the INEL impact zone.

#W22-01
09

The State and EPA Region X are reportedly experiencing financial restraints which have directly influenced their decision to eliminate pubic involvement opportunities in northern Idaho. EDI warned both agencies of this potentiality in its comments on the INEL Federal Facility Agreement.[EDI @ 20] Additionally, EDI advocated for language adopted by the State of Colorado and EPA Region VIII which provided for reliable funding for those agencies to meet their obligations in the Rocky Flats FF Agreement. That Agreement stipulates that: "EPA [Region VIII] reserves all rights to recover at any time and from any entity any past and future costs incurred by EPA and not reimbursed in connection with CERCLA activities conducted at the Rocky Flats Site"; [RF @ 67-68] and "the State [Colorado] reserves all rights it has to recover any other past and future costs incurred by the State in

connection with CERCLA, RCRA, and NCP activities conducted at the Rocky Flats Site." [RF @ 69] The Response to Comments on the INEL FFA/CO, states that: "Adequate funding is available for fiscal year 1992 for the present scope of activities under the Agreement." [@ 9] Hopefully, the State of Idaho and EPA will reevaluate their financial needs to meet their obligations and demand that DOE adequately fund the activities required in the INEL CRP.

#W22-01 09

EDI's review of Moscow's information repository revealed that data sheets for TAN radionuclide contamination were illegible. A call was subsequently placed with INEL Information Office 2/3/92 for an explanation and supplementary copies which are discernable. To date that request has not been honored. Whether by mistake or deliberate conspiracy, the fact is the public is again denied pertinent information upon which to appropriately comment on the plan.

Ground Water Contamination at TAN Comments

The self serving language in DOE's TAN Fact Sheets persists as with all previous publications on INEL. A consistent effort to minimalize the risks and hazards is pervasive. "The DOE believes the current risk of exposure to groundwater contaminants is minimal. At this time, only contaminated wells are located within a few miles of the TAN and all the drinking water at the facility is treated before use, so no human health exposures exist." [TAN @ 3] EDI considers this an incredulous statement when DOE later states that: "none of the [treatment] alternatives [in the interim actions] would meet drinking water standards for the groundwater under TAN." [Interim @ 8] Either the TAN potable water is not safe; or, DOE can treat the ground water for TAN production facilities but not for the cleanup of the TAN ground water contaminated by TAN facilities.

Of particular concern is the high tritium contamination at TAN and the public and worker risks from tritium exposure. For instance, huge tritium releases from INEL facilities have been largely ignored despite the known risks. A cursory review of the literature by EDI has reveled a significant body of research challenging DOE and the nuclear industry's public contentions that tritium is of little public health concern. DOE's public position is particularly troubling when its own contractor studies do not support their position. Two studies by DOE's Battelle NW Labs in 1972 and 1982 found that rainbow trout exposed to tritium only 0.4 above background levels resulted in permanent immune suppression in all the fish. Numerous other studies on animals have proven significant genetic damage and other biological disfunction as a result of tritium exposure. [16-22]

DOE's solicitous statement that the plume has only migrated a few miles challenges any public confidence that it is capable of objective characterization of its own mess. The following list of contaminates should be in DOE's CRP Fact Sheets yet was not.

List of contaminates of concern in the TAN ground water [6]

Organics and Inorganics	Radionuclides
Acetone	Cesium-137
1,1-dichloroethylene	Cobalt-60
1,2,-dichloroethylene	Strontium-90
Tetrachloroethylene	Tritium
Trichloroethylene	
Aluminum	Europium-151
Barium	Carbon-14
Chlorides	Plutonium-238
Chromium	Plutonium-239
Copper	Americium-241
Iron	
Lead	
Manganese	
Mercury	
Nickel	
Sulfates	
Zinc	

Proposed Plan for Interim Action at Test Area North (TAN) Comments

DOE only identifies trichloroethylene, tetrachloroethylene, lead and strontium as contaminates at TAN. [TAN @ 3] Where as the State's list additionally identifies "cesium, cobalt, plutonium, americium and tritium also have been detected at high activity levels in the [TAN] injection well." Though the State's list is more complete, neither agency is telling the whole story in their public literature.

The State cites migration of tritium and strontium-90 (Sr-90) in the ground water. [Over @ 29] Sr-90 levels of 10+/-2 pCi/L in TAN-1 well, 12+/-1.2 pCi/L in TAN-2 well, and 27 +/- pCi/L in APN-9 are also acknowledged by the State. [Ibid] The minimum Sr-90 contaminate level for drinking water standard is 8 pCi/L. TAN activity levels for other radionuclides in pCi/gm are: Cobalt-60 (14.12); Cesium-137 (12.34); Europium-151 (16.62). [6 @ B-5] Gross radioactivity in pCi/mL is: alpha (6); beta (4,900); and Tritium (1,030). The total radioactivity level is (3,100). [6 @ B-4] DOE has an obligation to state the above data in their fact-sheets, and the other agencies clearly are remiss by not insuring that appropriate data reaches the public.

DOE's contention that the contaminate plume has not migrated more than 1/4 mile [Interim @ 4] is in direct contradiction to its own Fact-sheet stating contaminated wells located within a few miles of TAN [@ 3] and the State's report.[@ 29] Additionally, DOE's claim that "trichloroethylene plume is not expected to reach existing supply or drinking water wells in areas outside of TAN for over 100 years" [@ 4] is currently being challenged. Knowledgeable hydrologists not related to DOE argue with justification that the aquifer is not homogenous and indeed the existence of lava tubes can provide for speedy dispersion of

contaminates. Even if the public were to accept the questionable 100 year migration time, the identified TAN Strontium-90 plume [Over @ 21] which has a half-life of 10,000 years, dominates the discussion.

Interim Action Alternatives

EDI considers any alternative which reburies waste extracted at TAN in any INEL waste site totally unacceptable. The only acceptable approach is to put the waste in monitored storage for ultimate disposal at a permanent nuclear waste repository. Only the most ill-conceived logic could propose reburial of hazardous chemical and radioactive waste over the principal aquifer for the whole region.

Additionally, any continued use of the existing TAN peculation pond - whether divided or not - is unacceptable. DOE's contention that "contaminates already in the pond would not be pushed deeper into the soil by water coming from the interim action" [Interim @ 6] is totally unfounded. EDI proposes a new fully lined evaporation pond, meeting Subtitle C requirements, must be built some distance from the present one to receive the processed TAN ground water. Even if the new lined pond had some minimal leakage, the water would not be flushing subsurface contamination downward as would be the case in the existing TAN peculation pond. Anther possible technology which should be evaluated is biologic absorption such as an artificial wet-land rather than a evaporation pond.

DOE acknowledges that: "The treatment facility built under these alternatives would be expected to remove a minimum of 90% of the contaminates in the groundwater before the treated water is discharged to the TAN disposal pond." And that: "none of the [treatment] alternatives [in the interim actions] would meet drinking water standards for the groundwater under TAN."[Ibid. @ 8] EDI suggests that technologies do exist to treat the groundwater to drinking water standards. No public acceptance should be expected for reintroducing contaminates back into the aquifer because DOE does not want to spend the money on appropriate technologies. If the agencies proceed with the identified treatment processes, the bottom line is do not use the existing TAN peculation pond. Therefore, the "treated" groundwater must be categorized as a hazardous waste; and the new EDI proposed lined evaporation pond must be permitted by the State as a RCRA waste site.

EDI has previously challenged INEL's incinerators. See Citizens Guide to INEL. DOE's claim is unfounded that; "The only acceptable disposal option for this mixed waste [filter] carbon would be complete destruction in a special incinerator that could also capture the radionuclides." [Ibid. @ 10] Any plan which incorporates the use of the aging industrial Waste Experimental Reduction Facility (WERF) incinerator is unacceptable.

Additionally, delisting TAN waste treatment residuals from the hazardous waste classification subject to RCRA Subtitle C hazardous

waste disposal and closure requirements; and classifying the waste in the same category (Subtitle D) as municipal garbage, is illegal. This arbitrary switch in waste classification by the stroke of DOE's pen must not go unchallenged by the State nor EPA.

Little public confidence exists for EPA's Best Demonstrated Available Technology (BDAT) requirements. For a detailed discussion on these inadequate and controversial regulations see the Natural Resources Defense Council's comments on "Land Disposal Restrictions for Newly Listed Wastes and Contaminated Debris", RCRA Docket No. F-91-CD2P-FFFF. "Although EPA acknowledges that technology is available, has been demonstrated and meets all of the relevant standards for MWW constituents, the agency improperly based its BDAT determination on less effective incineration and solvent extraction technologies." Moreover, "incineration technologies often cause an unreconcilable conflict due to the need to operate at a high enough combustion temperatures to destroy organic wastes without also volatilizing the radionuclide constituents." [NRDC # 4]

DOE's statement on alternative 4 that: "...its complex design would require special engineering and construction techniques that may reduce its long-term operating effectiveness", [Interim # 8] must be further substantiated to be believable. Once again, DOE drags its bureaucratic feet when ever cleanup challenges arise. Yet when there is a nuclear production project - needed or not - it is quite prepared to throw its collective scientific weight - not to mention billions of taxpayers dollars - at the project. Moreover, the State and EPA enforcement agencies appear to be just along for the ride and not exercising their mandated oversight duties.

Another monumental problem faced at INEL is the strangle hold EG&G and Westinghouse have on the site. What cleanup money does finally make it to Idaho, is eaten up by these site contractors which charge 350% overhead for doing the work. Cleanup contracts at other DOE sites allow only 50% overhead charges, and consequently get three times the work accomplished. Taxpayers are justifiably outraged by the systematic milking of the cleanup cow by the very polluters who caused the contamination in the first place.

The following DOE and INEL budget figures are offered as a means of putting the cleanup operations into perspective. The numbers tell the real story as to where DOE's priorities actually lie, and the rhetoric about its commitment to environmental concerns are in actuality quite empty.

DOE FY93 Nuclear Weapons Budget [12]

Weapons R&D and Testing.....	1.9 billion
Weapons production.....	2.6
Weapons production support....	0.7136
Weapons materials production..	1.8
Other weapons projects.....	0.49
Total nuclear weapons programs	7.5

DOE/INEL FY93 Budget (total 1.36 billion)

ICPP Construction\Operation... through 1994 (409.0 m)	87.1 million
Env.Restoration/Waste Mang....	465.8
Environmental Restoration.....	70.0
5% of INEL Budget	
15% of INEL ER/WM Budget	

Proposed Plan for Cleanup of Unexploded Ordnance

EDI disagrees with the selection of alternative 3 for the same reasons as stated above concerning incineration. EDI would however support alternative 4 -detonation and disposal on-site, on-site composting of contaminated soil. #W22-02 20 #W22-03 21

Conclusion

DOE continues its misguided priorities year after year - regardless of changes in the world politic. Of the $5.3 billion for environmental projects at DOE facilities, only $1.38 billion (25%) is for actual cleanup of nuclear weapons facilities.[13] Of the $1.36 billion spent at INEL, $465 million goes to environmental restoration and waste management which is a category which includes 85% production related spending. Of that $465 m. sum only $70 million or 15% is going for actual cleanup. Of the total INEL budget, only 5% is going for actual cleanup. [AP 1/30/92]

INEL continues to pump $409 million into the ID Chemical Processing Plant (ICPP) despite the fact the Admiral Watkins acknowledged before last week's Senate Budget hearing that neither DOE nor the Navy needs highly enriched uranium (U-235). For every cubic meter of U-235 the ICPP produces, 5,000 cubic meters of High-level waste is generated. ICPP also generates 18 million times the volume of U-235 in Low-level waste. [7]

DOE will spend through 1993, $278.8 million on the New Production Reactor which Watkins again was forced by Senators to admit that DOE no longer needs. Even more preposterous is the $474 million budgeted for nuclear bomb tests in Nevada in 1993.

Creative accounting continues in DOE's Budget to Congress. Production projects continue to be shifted over into the cleanup budget. Break downs by waste area groups is not done so that enforcement agencies have little idea if adequate funding is being sought to meet cleanup agreement milestones. No correlation exists between funding requests and additional work (add-sheets) required by regulators to meet agreements. Pit 9 remediation work at INEL's Radioactive Waste Management Complex (RWMC) reportedly was not included in DOE's FY93 budget.

State and EPA acceptance of expedient cost cutting measures for INEL cleanup so that DOE can continue to pour tax dollars down the nuclear production rat hole simply defy civil - socially acceptable-description.

The deliberate, systematic, and strategic exclusion of northern Idaho citizens from the public involvement process because they have offered the most substantive challenges to irrational policies at INEL is unconscionable. These DOE strategies endorsed by the State and EPA will escalate the public's distrust and credibility flight from the INEL cleanup process.

The thirty member Military Production Network, which EDI is a member organization, developed a model for public involvement in the DOE cleanup process. Tim Connor recently presented this model on behalf of the Military Production Network to the EPA sponsored Keystone Federal Facility Dialogue meeting in Colorado. This "Citizens Participation Guidelines and Model" outlines a framework of site specific advisory boards and a national advisory board which will provide for substantive public involvement in the DOE cleanup process. Indicative of the mainstream acceptance of this proposal, Senator Larry Craig indorsed the concept at the recent INEL Summit in Boise. EDI hopes this model can be implemented at INEL in the near future.

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